DECEMBER 20, 1954

NEWS ISSUE

Electrical World

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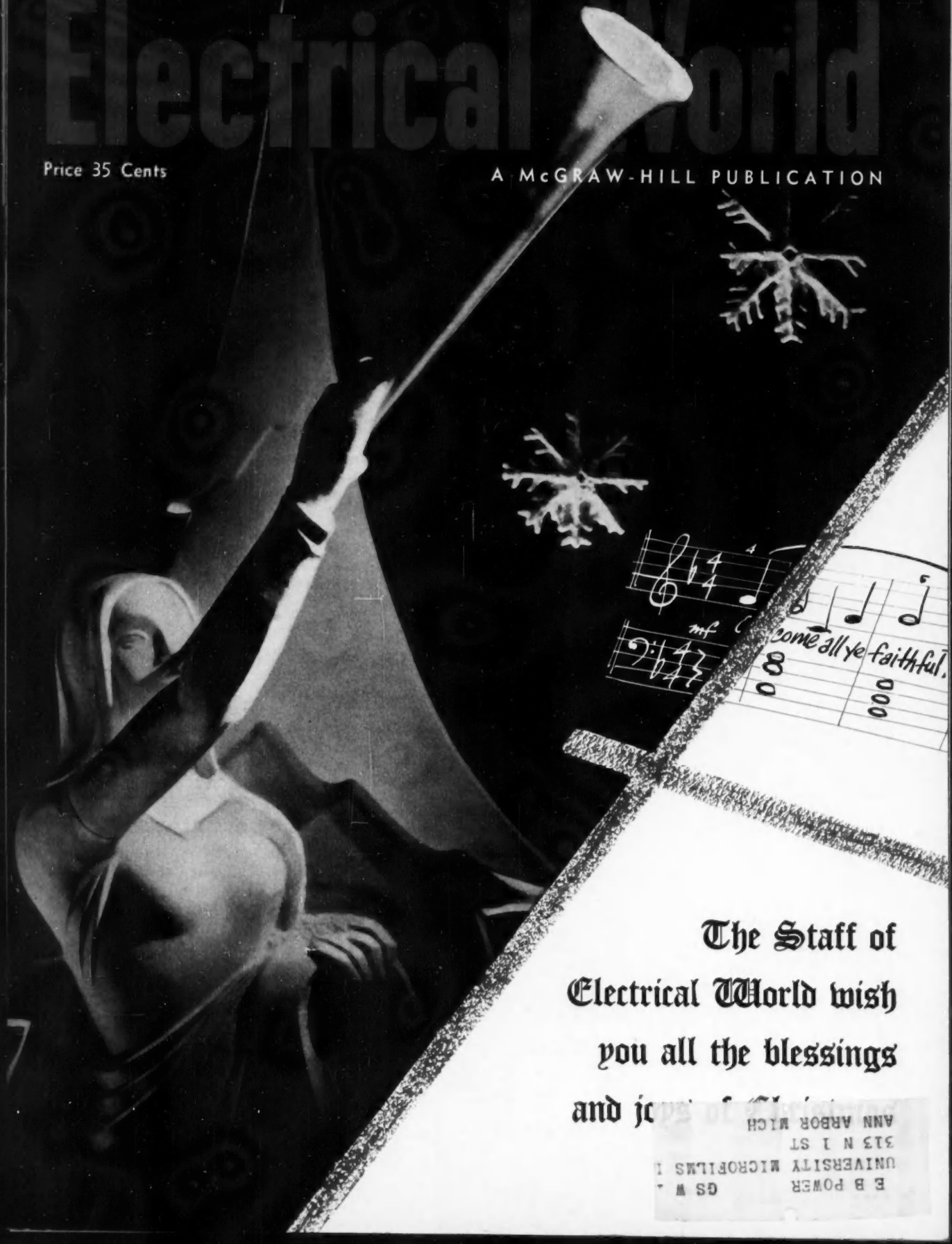

The Staff of Electrical World wish you all the blessings and jo

E B POWER GS W
UNIVERSITY MICROFILMS I
313 N 1 ST
ANN ARBOR MICH

RAPID CALCULATIONS by one of Card Programmed Calculators used by G.E. for turbine and power transformer designs are reviewed by Analytical Engr. Ed Magnusson and Lynn Wetherill, Mgr. Engineering, Power Transformer Dept. "CPC", like electronic analog computer used for switchgear designs, is setting the stage for lower cost electrical apparatus.

Now—electronic computers reel off equipment designs to cut system costs

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Substantial savings in engineering time and greatly increased selection of apparatus design possible through General Electric's use of electronic computers points the way to a reduction in power system dollars per kva of capacity. In some instances savings of as high as 97% in the design time of large equipment have been made through the use of card program calculators, effectively reducing costs and at the same time permitting many more design approaches to be investigated.

CONSERVE ENGINEERING TIME

Calculating machines are helping engineers determine the most suitable turbine, power transformer and switchgear designs for any system. Their use has in many cases slashed the 15 to 40 hours of computation time formerly required on elaborate calculations to a single hour. Whether applied to preliminary specifications or to detailed product designs, such savings point to ultimately lower cost power system equipment.

BETTER PRODUCTS FORECAST

In addition, the new computers permit engineers to consider an extended range of equipment and system designs without incurring the high costs associated with old style methods. And computations can now be completed with greater accuracy.

Developments such as the application of electronic computers to electrical apparatus designs can help electric utilities obtain most suitable and efficient systems possible. To take full advantage of their speed and accuracy, contact your Apparatus Sales Engineer early in your system planning. General Electric Company, Section 301-278, Schenectady 5, N. Y.

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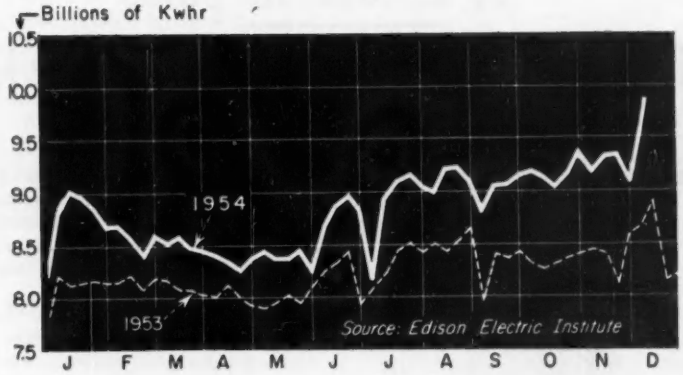
GENERAL ELECTRIC

Electrical World

Vol 142 No 25 ABP ABC December 20, 1954



Output Week Ended Dec. 11—9,846,000,000 Kwhr

Per Cent Change from Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Dec. 11	+13.7	+10.1	+7.8	+10.5	+5.0	+26.2	+12.5	+8.9	+8.8	+9.0
Dec. 4	+12.0	+7.2	+5.0	+8.5	+2.6	+23.9	+10.1	+8.8	+9.9	+10.9
Nov. 27	+11.7	+5.4	+5.3	+9.4	+3.1	+23.3	+11.1	+7.5	+5.6	+8.9

Seasonally Adjusted Index †179.9 Week Ago 177.0 Year Ago 158.2

Electric Power Statistics

		Latest Month	Preceding Month	Year Ago
Peak Load ‡(Million Kw)	Sept.	79.4	79.7	74.4
Capacity (Million Kw)	Oct.	100.01	99.16	88.62
Production (Billion Kwhr)	Sept.	39.55	41.17	37.03
Hydro	Sept.	7.80	8.34	7.59
Fuel	Sept.	31.74	32.82	29.44
Fuel Consumption				
Coal (Million Tons)	Sept.	9.73	9.83	9.67
Oil (Million Barrels)	Sept.	4.90	4.85	6.16
Gas (Billion Cu Ft)	Sept.	118.62	130.49	105.14
Sales (Billion Kwhr)	Sept.	34.05	33.88	32.64
Residential	Sept.	9.76	9.65	8.55
Commercial	Sept.	6.69	6.66	5.90
Industrial	Sept.	15.00	14.89	15.67
Other	Sept.	2.60	2.68	2.51
Net Income Class A & B Companies ($ Million)	Sept.	92.41	89.43	80.66
Estimated Dec. '54 Peak ‡(Million Kw)	Sept.	87.8	88.0	91.2
Kwhr per Residential Customer (12 Month Average)	Sept.	2,496	2,476	2,302
Revenue per Kwhr Residential Service (12 Month Average)	Sept.	2.70¢	2.71¢	2.75¢
Canadian Production (Billion Kwhr)	Sept.	5.51	5.45	5.09

Business Statistics

FRB Industrial Production Index†	Oct.	129	126	136
Gross National Product Annual Rate ($ Billion)	3rd Qtr.	355.5	356.0	367.2
EW 4 Industry Production Index†	Oct.	116.6	116.0	124.0
ENR Construction Cost Index††	Nov.	134.8	134.6	128.1
BLS Consumer's Price Index	Oct.	114.5	114.7	115.4
NEMA Insulation Materials Sales Index†	Sept.	123	111	153
NEMA Electric Appliance Sales Index†	Sept.	115	91	102
NEMA Household Refrig. Sales Index†	Sept.	73	71	62

*Preliminary **Revised ‡Class 1 Systems †1947-49=100 ††1949=100

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Here's Proof of Performance...

Average annual replacement of Creosoted poles is only 1.3% on this 38-year-old line

● Keeping pace with the state's industrial expansion, the Georgia Power Company has invested 238 million dollars in new generating, transmission and distribution equipment since the end of World War II. The tremendous output of this expanded system is distributed to users on pressure-creosoted poles.

A. C. Henderson, supervisor of transmission lines, explains, "We have tried other types of poles in the past, but we always go back to pressure-creosoted southern yellow pine."

Experience has proved pressure-creosoted poles held replacements to a minimum. A 44,000-volt line near Atlanta has been in service since 1916. There are 1,159 poles in the line, and since present record-keeping methods were begun in 1942, only 166 poles have been replaced. That's an average annual rate of 1.3% on a line now 38 years old.

Long pole life and a low replacement rate like this can be confidently expected when poles are pressure-treated with Creosote—the preservative with *proved* records of long-term performance.

And you'll get best results with USS Creosote, the uniform product of United States Steel's tar distilling operations. For complete information, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

C. C. WHITE is inspecting one of the 38-year-old pressure-creosoted poles in the 31.6 mile line of the Georgia Power Company, between Norcross and Porterdale.

USS CREOSOTE

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4-1872

UNITED STATES STEEL

THE ELECTRICAL WEEK

The Issue's News Highlights . . . Administration has prepared new rules to guide federal agencies in making proposals for multipurpose water resources projects.

Hearings on MVGC financing plan continue before the Securities and Exchange Committee.

Chairman Moses of New York State Power Authority outlines tentative plans for the distribution of power from St. Lawrence project.

New England-New York Inter-Agency Committee on the potential land and water resources of the river basins and coastal areas of the seven Northeastern states has done excellent work over past four years, speakers told a public hearing in Springfield, Mass., last week. Col B. B. Talley, committee chairman, said the 41-volume report, would provide an "inventory guide" for future hydro undertakings.

Major electrical equipment manufacturers last week painted a rosy outlook for 1955. Westinghouse Pres Gwilym A. Price anticipated an "increase in orders in 1955 of some 10%" and that 1955 "sales billed will approach or equal the 1954 record." Westinghouse shipments this year set new high of $1.6 billion, said Price. Speaking for General Electric Co, Pres Ralph J. Cordiner predicted that the firm's business, other than defense products, would be up 5 to 8% over 1954 compared with 3% gain in 1954 over 1953. Consumer goods will show greatest increase of any product line; heavy apparatus the smallest. But each 1955 quarter should be better than the 1954 period.

Philadelphia Electric has chalked up a record by returning to service in just over 11 weeks the 150,000-kw generating unit of Cromby Station which was taken from service Sept. 27. Unit was removed from service after it was virtually destroyed by what appeared to be failure of a rotating portion. No shortage of power was caused by loss of the unit. A second, 200,000-kw unit now is being added to Cromby.

Texas Power & Light Co has offered City of Greenville $5.3 million for its power plant. Offer follows public demand to city to invite bid from TP&L.

Columbia Interstate Compact was discussed with federal officials in Washington last week by representatives of seven Northwest states. Talks aimed at settling such issues as downstream water rights and power allocations to clear the way for Congressional approval. Meanwhile, Washington State Rural Electric Cooperative Association has voted opposition to the compact. The co-ops support a ten-year moratorium on development of Snake River between the Hells Canyon and Nez Perce dam sites.

Off the Washington Wire . . . Fred G. Aandahl, assistant Interior secretary, expects larger appropriations for Reclamation Bureau's construction program next year. He anticipates gradual build-up of that program, but has not detailed authorizations needed.

Ralph J. Foreman was named REA administrative officer to work with REA borrowers in power supply matters . . . Raymond O. Bell, assistant to vice president, Allis-Chalmers Manufacturing Co, was named director of Electrical Equipment Division, Business and Defense Services Administration.

Sen James E. Murray, incoming chairman of Senate Interior Committee, is conferring with Sen Wayne Morse (Ind-Ore.) on preparation of legislation to block private development of Hells Canyon.

FPC reports electric revenues of larger utilities totaled $550.8 million in October, compared with $517.4 million a year ago.

New Hampshire Public Utilities Commission Chairman Harold K. Davison deplores public misconceptions of how commissions make rate decisions. "It is legal duty of commissions to make fair decisions, not popular ones," he recently told Manchester Rotarians. "Fair rates to customers and fair returns to investors are the objective," he said.

Maryland's State Commission to Revise and Recodify the Public Service Commission Laws has published its recommendations. It suggests adequate service an essential in determining rates charged by utilities.

Public ignorance of new Atomic Energy Act is responsible for branding it as a "give away" to private enterprise, according to Francis K. McCune, general manager of General Electric Co's Atomic Products Division. Actually, government control retained "is very nearly absolute," he says.

AEC has awarded American Locomotive $2 million contract design and build 2,000-kw package nuclear reactor power plant for Army Corps of Engineers . . . Consolidated Edison Co of New York hit record peak of 3,020,000 kw on Dec. 6, compared with previous record of 2,895,000 kw in 1953 . . . FHA has asked Industry Committee on Interior Wiring Design for suggestions for improving minimum wiring requirements for government-backed housing.

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New Rules for Federal Hydro Projects

Probable Effects

Here are some of the things to look for when the new regulations on hydroelectric and multipurpose water resources projects take effect:

• Tighter requirements will make it much more difficult for Army Engineers and Reclamation Bureau to justify 100% federal financing.

• Officials expect less federal pre-emption of such works should hasten rather than retard construction of multipurpose projects—that local interests will have an incentive to prepare plans to get projects underway, since they have a large part of the responsibility required to reap the benefits.

• Democrats are expected to attack the document since it is the most detailed spell-out of the Eisenhower position in the private vs public power controversy.

Changed rules to take effect early next year will guide federal agencies more closely along Eisenhower lines in working up future proposals for hydroelectric and multipurpose water resources projects. The Budget Bureau has redrafted the standards and procedures that it put together for President Truman late in 1952, reshaping those regulations to fit the federal-local partnership concept of the present Chief Executive.

The new rules will affect future construction—improvements and additions to existing projects, as well as new starts.

Partnership Stressed

Partnership potentials are stressed repeatedly throughout the revised document. But the new opportunities are no cake walk for local interests, either public or private. In every case, state and local sponsors of projects—or participants in projects—must pay their full share of costs.

Right at the start, the new rules—labeled as Circular A-47, revised—say that the federal government's role is to cooperate on water resources projects and not to take them over as its own special province and keep others out. The circular then goes ahead to set up criteria that would limit the federal government to programs and projects that cannot be built as effectively by local interests.

Federal agencies must follow the rules, once they are issued, both in preparing reports on proposed projects and in submitting budget estimates of money needed to start the projects, after the work has been authorized. The draft was sent to the affected agencies last month by Budget Director Rowland R. Hughes. He may modify the requirements somewhat after hearing from the agencies, but the rules now being discussed are expected to take effect pretty much in their present form.

Under the new rules, the criteria for evaluating projects go far beyond the old basic yardstick of the benefit-cost ratio—whether the value of benefits exceeds the sum of all costs. To make room for Eisenhower's ideas, the new standards require answers also to questions on participation by state, local, and private agencies, on the relation of each project to comprehensive development of the entire river basin in which it lies, and on the effect the project will have upon economic development—local, regional, and national.

Non-federal development of water resources projects gets a strong plug in the new document. A good example of this sort of arrangement was the recent Congressional authorization permitting the Alabama Power Co to build five dams on the Coosa River—with built-in provision for later addition of locks by the federal government. A-47 as revised would direct federal agencies to propose authorizing legislation when necessary.

For every project undertaken by the federal government, however, the top criterion still remains the benefit-cost analysis. The new circular lays down harder requirements for benefit and cost estimates and their derivation. As an example, estimates of annual benefits are not to be based on simple projections of initial benefits, but are to make allowances for possible decreases in productive capacity of the project and for what might happen to annual revenues if the project became obsolete through technological advances.

Benefit-Cost Analysis

Benefits that can be used in the benefit-cost analysis are sharply limited by the circular; they include only primary benefits which result directly from the purposes on which money is spent in building the project. Local secondary benefits such as commercial and industrial development induced by a project cannot be considered in benefit-cost analysis.

Nine purposes in the original circular appear again in the revision: Electric power, flood control, reclamation, navigation, watershed betterment, domestic-municipal-industrial water supply, recreation, fish and wildlife, and pollution control.

On the method of allocating costs among the various purposes on any project, however, the new rules are definite and specific. They direct the agencies to apply the separable costs-remaining benefits method adopted

jointly by the Interior Department and the Army Engineers this year (EW April 5, p 93). Exception is allowed only where the sponsoring federal agency can demonstrate that an alternative method is better because of special conditions on an individual project.

Under the specified method, the separable cost for any purpose are first allocated to that purpose. This cost is found by subtracting what the project would cost if the purpose were left out from the total cost of the project with the purpose included. The difference is the separable cost for the purpose.

Joint Costs

The sum of all the separable costs for specific purposes is deducted from the total of project costs. Remaining costs are defined in the new circular as joint costs—an entirely different definition from the commonly accepted meaning of joint costs as the total cost of jointly used faciilties.

One of the tough requirements running through the nine sections calls for full repayment to the federal treasury of reimbursable costs that will run heavier rather than lighter than they do now. Repayments, as usual, must include interest, with the single exception of costs to develop farm lands by reclamation, for which interest is waived by law. Repayment periods are limited in general to 50 years, except for reclamation facilities, which may be allowed 60.

All power costs, of course, must be repaid with interest. In determining primary power benefits, important to the benefit-cost ratio for the project, however, the new rules direct the agencies to use the cost of construction by other groups—public or private—to supply the same power needs. Or, if that cost runs higher than power users could pay, the agencies must use a lower figure—the cost that feasible power charges could support.

Other requirements in the new document pin down the agencies in making estimates for power features in any project. For example, they must report the cost of including power facilities in the project as compared with the cost of obtaining power from another source. Further, the cost estimates for the two possibilities must show taxes and interest charges on a comparable basis.

EDGAR H. DIXON (center) testifies at SEC hearing on MVGC financing. With him are Hayden N. Smith (left), attorney for Southern Co, and Daniel James, attorney for Middle South

MVGC, Public Power Wrangle

Sponsors of West Memphis, Ark., plant questioned at SEC hearings. Senator Anderson asks agency to withhold approval

Sponsors of the Mississippi Valley Generating Co continued to face the consolidated onslaught of 36 public power groups at Securities and Exchange Commission hearings last week.

The State of Tennessee and 35 municipalities, power boards, and rural electric cooperatives have retained the Washington law firm of Volpe, Boskey and Scallerup in their attempt to block equity financing for the new West Memphis, Ark., steam plant proposed by the Dixon-Yates firm to fulfill its contract to supply 600,000 kw to the Atomic Energy Commission's Paducah, Ky., atom plant.

Examines Dixon-Yates Witnesses . . . Counsel Joseph Volpe questioned the Dixon-Yates witnesses in an attempt to prove (1) interlocking relationships among Middle South Utilities, Inc, and the Southern Co—sponsors of MVGC—and other utilities, (2) that investment in the new plant would not be a worth-while venture for prospective lenders who would put up about $100 million in debt capital, and (3) the proposal which led to the contract did not come about as described by Dixon-Yates witnesses in SEC's and Congressional hearings. As of last week, the public power intervenors had not proved any of these contentions to the satisfaction of the commission. Nor had they, for that matter, established their own qualifications as interested parties to the SEC proceedings.

Many issues remained unsettled after a full week of hearings. Some of the matters discussed were:

- Participation of the Southern Co —James M. Barry, chairman of the company's executive committee, said the firm decided to participate in formation of the MVGC because of the President's Budget Message opening the door to private supplies of electric energy for AEC installations, the need for new TVA-area capacity and Congress' failure to provide funds for a new public plant, existing Southern Co interconnections with Mid-South and TVA, the reasonableness of the anticipated profit return, and precedents of Electric Energy, Inc, and Ohio Valley Electric Corp contracts.
- The question of interlocking relationships—SEC Chairman Ralph Demmler ruled issue before the commission was whether acquisition of MVGC stock by the two sponsoring firms would create an interlocking relationship, rather than whether negotiations might tend to create such a relationship. He expressed the view that "arrangements which exist are one thing, but conservations about arrangements are another." Nevertheless, the commission permitted Volpe to cross-examine MVGC witnesses about contract's background.

• Participation of other companies —Questioned by Volpe as to whether Mid-South or the Southern Co had considered separate or competitive proposals to supply the needed power, Dixon reiterated that any other company was welcome to participate, but no offers had yet been received.

• National defense considerations —Volpe attempted to show that the new plant was not needed to bolster AEC's military program. His aim, apparently, was to remove this factor as a possible justification for SEC approval of formation of the new company. He pointed out the EEI and OVEC contracts had been approved by the commission partly on the basis of a defense consideration, and attempted to show there were no similar "mitigating circumstances" surrounding the contract in question. His line of questioning was objected to, and sustained by Demmler.

• Unusualness of a 5.5% equity investment—Under Volpe's questioning, Dixon cited EEI and OVEC contracts as establishing precedent for such financing.

• Debt financing—Dixon said he hoped negotiations with insurance companies and banks expected to supply the $100 million debt capital would be concluded by Feb. 15.

Meanwhile, AEC's negotiations with the Tennessee Valley Authority resumed after a break of several weeks. TVA must "wheel" Dixon-Yates power to Paducah, some 200 miles from the proposed new steam plant, and a contract to arrange for this is being negotiated. At the start of these meetings, AEC wanted TVA to pay for all necessary installations and added costs of getting the power to Paducah, but AEC has backed down on these demands to a large extent.

One other development in the Dixon-Yates controversy occurred last week. Sen Clinton P. Anderson, incoming chairman of the joint atomic energy committee, asked SEC to withhold approval of the contract until the 84th Congress has a chance to review it. He also asked that SEC carefully examine several portions he believes should be changed before investors are permitted to put up any money. He especially asked review of provisions under which the government would (1) Reimburse the company for taxes, (2) continue to pay for power even if plant is down, and (3) pay for 600,000 kw of power even if it were receiving less.

USBR's Taliaferro Joins N. Y. Power Authority

Henry B. Taliaferro, chief of the Reclamation Bureau's Power Division for less than a year, has left the government agency to take a job with the New York State Power Authority. Reclamation Commissioner Wilbur A. Dexheimer is not expected to choose Taliaferro's successor until he completes a field tour.

Taliaferro, whose appointment became effective Dec. 1, will serve the state agency as director of power utilization from headquarters in New York City.

HENRY TALIAFERRO

A graduate of the U. S. Naval Academy, Taliaferro worked with Potomac Electric Power Co before becoming office engineer to the chief of construction at Bonneville. Later he was assistant to the chief engineer in charge of the Bonneville Power Administration office in Washington, D. C. Prior to assuming the post of acting director of the bureau's power utilization branch in 1952 Taliaferro was regional power manager for the Reclamation's Central Valley project.

New FPC Vice Chairman

Federal Power Commission unanimously elected Louisiana Democrat Seaborn L. Digby to serve as its vice chairman for 1955. Digby became a commissioner Aug. 17, 1953. He succeeds Commissioner Claude L. Draper, who has been vice chairman since June 23, 1953. FPC elects a vice chairman each year to serve as substitute for the chairman.

Moses Outlines . . .

. . . tentative plans for distributing St. Lawrence power with all customers treated "fairly"

Never one to speak softly when a swipe with the big stick would do just as well, Robert Moses, chairman of the Power Authority of New York State, was in good form at Ogdensburg, N. Y., last week. Addressing the St. Lawrence Valley Association of Chambers of Commerce, he swung out at private utilities; domestic equipment manufacturers; Gordon Clapp, deputy New York City administrator (without actually naming him); dredging and towing interests; and the St. Regis Indians.

Using abusive language but offering no evidence, the sharp-tongued Moses lashed out at the five New York utilities over the Niagara issue. He accused the companies of being "experienced in the low blow and gutter fighting of half a century ago, but without much grasp of public relations and public opinion as they are today."

The authority could "lick them into the ground. If not, they will be in the courts for a long time with no hope of ultimate victory," Moses added.

Fair Treatment for All . . . The people of the valley, Moses continued, wanted to retain as much of the 900,000 kw of St. Lawrence power as possible for local industry. They did not want it diverted to New York City by "uneconomic transmission schemes," or to some "imaginary gigantic pool." But all the power could not be promised to the valley. Some would go elsewhere; some to rural electrification and municipally operated units "which can be reached;" some may provide "small yardsticks." "We want customers, all kinds and all will be treated fairly," the Power Authority chairman said.

No St. Lawrence power would ever reach New York City (as proposed by Clapp), Moses said, because the cost would be prohibitive. He also contended the power will cost taxpayers nothing "excepting in future, supposititious taxes which no one pays now and nobody is losing."

Consumers will save the "dividends and other profits the five private utility companies are reaching for in their attacks."

Progress Detailed . . . The authority chairman made these announcements:

- The authority is selling immediately $330 million of bonds through bankers and underwriters.
- A tentative agreement has been reached with Aluminum Company of America on rates for firm, interruptible, and secondary power.
- The authority is conferring with "all responsible interested agencies" on sale of remaining power.
- It will take bids in near future on turbines, generators, transformers, and other equipment from "all qualified bidders, domestic and foreign." The authority will "not be swayed by pressure brought by manufacturers who have thus far used every means, fair and foul, including labor union intervention, to get us to exclude foreign competition."

In reference to Moses' remarks on equipment bids, the presidents of General Electric Co and Westinghouse Electric Corp denied attempting to have foreign bids excluded.

Ralph Cordiner said GE has never talked to Moses or attempted to bring pressure on him or through labor unions to get him to buy American equipment for St. Lawrence.

And Westinghouse's Gwilym Price issued the following statement:

"No one in Westinghouse has ever discussed the St. Lawrence power project or the subject of foreign competition with Mr Moses. To the best of my knowledge, no union or any other third party has made any representation to any official of the Power Authority, or any other state official on either of these subjects. . . ."

PP&L Gives Portland New Landmark

As part of its observance of Light's Diamond Jubilee, Pacific Power & Light Co has capped its headquarters building in Portland, Ore., with a brilliant new neon sign (shown above). The new sign will be a permanent fixture and replaces a 25-year-old incandescent flasher which showed one word at a time.

The "spectacular" was inaugurated earlier this month in ceremonies attended by George T. Bragg, vice president and general manager of PP&L; Willard S. Christine, vice president of Electrical Products Co, Portland, builders of the sign; and others. A glow of light from a replica of Edison's first bulb set off a magic-eye beam turning on the sign.

The new Portland landmark contains 8,000 ft of neon tubing, operates on a 20-sec cycle and produces a rolling white, green and rose curtain behind the letters.

U. S. Asked to Reconsider Utility Relocation Costs

Expansion of the federal-aid program for highway projects to meet increasing needs of interstate commerce and national defense has presented utilities with a problem involving extensive costs of relocating utility facilities.

This problem prompted a group of utilities to submit a memorandum to the President's Advisory Committee on a National Highway Program asking that the unit recognize relocation cost inequities now existing. It further requested that any recommendations which may be made include provision for reimbursement of utility relocation costs due to the proposed enlarged federal-aid highway program.

The memorandum points out that the solution to the problem requires a determination of whether utility relocation costs on public rights-of-way necessitated by the highway program are properly chargeable to that project or whether costs should be borne by utilities and their subscribers. Utilities feel it is inequitable to the users of utility services to impose on them the relocation costs incurred under the program. They claim costs should be charged to the highway project.

Outlined in the memorandum were these key factors: (1) Utilities' right to occupy public right-of-way, (2) need for reexamination of federal policy, and (3) need for federal government to set policy and pattern for utility reimbursement.

Group submitting the memorandum included these electric power representatives: Edison Electric Institute, National Association of Railroad and Utilities Commissioners, and Tennessee Valley Public Power Association.

IN THE INDUSTRY

Marketing Policy Legislation Poses Problems Aplenty

Present laws relating to the marketing of electric power from federal plants are vague, permitting widely varying interpretations. Using the authority conferred by these laws, the Roosevelt and Truman Administrations were able to steer a marketing course strongly biased in favor of public power groups. Without changing these laws in any respect, the Eisenhower Administration has moved toward a more moderate, fairer course in disposing of federally produced power.

Leaders in the electric utility industry have for some years considered recommending improvements in these laws which would make them less dependent on the whims of political expediency. The general idea has been to spell out the specifics in an effort to assure a fair break for all users of electricity.

Two Problems . . . Here are two of the problems that have come up for discussion in connection with fair power marketing legislation:

- Should these changes be recommended in the form of a single bill setting forth the specific requirements for marketing federal power, or should the changes be suggested in the form of amendments to present laws or bills that will later come before Congress?
- Should these changes be aimed at erasing the inequities now existing between federal power rates and those of other suppliers, or should they be aimed directly at the marketing provisions of present laws and especially the "preference clause"?

Some leaders favor recommending a single bill encompassing some or all of the needed changes in power marketing legislation. They argue that such a bill would bring the needed changes to public attention and promote the kind of study and public discussion that must precede any basic legislative change. They further see such a bill as a rallying point for those who favor changes in present marketing laws.

Others argue that a general bill of this kind would only promote useless ideological argument and might not be specific enough to accomplish the needed changes. Those who hold these views think it would be more effective to write the changes into project authorizations, appropriations, and other measures as they come before Congress for consideration. The advantage, according to this argument, is that the amendments would relate to specific projects or practices and by inference to other related legislation.

What Changes . . . The actual content of suggested changes poses a much more difficult problem than the method of offering them. Some men in the industry believe that if the inequalities between federally operated and business-operated projects were eliminated, there would be no marketing problems worth worrying about.

This group argues that if the cost of the power features of federal power projects were accurately stated, if these projects were required to return to the government a fair rate of interest and an amount equal to the tax assessments on private projects, then the majority of the present marketing inequities would no longer exist.

The "preference clause" which is found in some form in almost every law relating to disposal of federal power has received considerable attention. This clause gives priority to public bodies and cooperatives in the purchase of federally produced power. Customers of these publicly and cooperatively owned utilities represent only about 20% of the electric power customers in the nation.

Because federal power has been priced considerably cheaper than that available from other sources, the preference clause has favored the consumer obtaining power from public bodies or cooperatives. The preference clause, in some cases, has been used to drive electric companies out of business.

If the dollars and cents picture of the "preference clause" can be conveyed to the general public, industry leaders are convinced that its discriminatory features would be dramatized. But the average citizen must be shown that the federal government is giving the break to the 20% of the customers who depend on public power at the expense of the 80% obtaining power from other sources.

Of course this discrimination would nearly vanish if the price of federal power were brought more nearly in line with actual cost or with the price of power from other sources.

TECHNICAL NOTES

ARCHER E. KNOWLTON

Zirconium naphthenate enhances the drying power of paint dryers and produces an exceptionally hard, tough paint film.

Over-centralization of controls may result sooner or later in diminishing returns because additional operators might be needed to tend the more remote pieces of equipment.

Handbooks hardly have data fitting the high heat transfer rates of a high-neutron-flux reactor in which power density is many times that in an internal combustion engine or even a rocket.

Increase from 80 to 120 kv in the impulse level of an earthed 11-kv line should reduce the number of lightning flashovers by about one-half.

Optimum frequency and tie-line-power controller gains are much smaller for a hydroelectric system than for a steam-electric system.

Prospective variety of fuels for a plant calls for appropriate scope of facilities for ash handling as well as suitable hoppers, burners, and pulverizers.

Superheater tubes should neither be flooded by unduly high drum water level nor subjected to excessive gas temperature during turbine start-up.

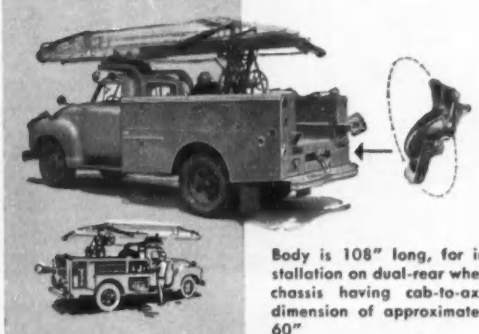
Selenium rectifiers constitute about 25% of the 245,000 rectifiers applied on the Bell System; voltages range up to 2,500 and kilowatts to 10.

POWERS *American*

Series 450 CONSTRUCTION AND OVERHEAD MAINTENANCE BODY

Does the Work of TWO TRUCKS

Ladder can be revolved 360° at elevations from 30° to 75°. In 23'6", 26'6", and 30'6" mechanical units, or 35' hydraulic model.



Body is 108" long, for installation on dual-rear wheel chassis having cab-to-axle dimension of approximately 60"

Derrick utilizes flexible steel cable instead of conventional center leg. Stows in loading area rack when not in use.

Here's a multi-purpose body that does work normally requiring two or more specially-equipped vehicles.

FOR OVERHEAD WORK . . . the body has a Powers-American mechanical or hydraulic Aerial Ladder, in a working height best suited to individual needs.

FOR SERVICE WORK . . . compartments provide space for the orderly storage of a wide assortment of tools and parts.

FOR CONSTRUCTION WORK . . . simplified, easy-to-use derrick handles poles up to 35 ft. in length. A 10,000 lb. underslung winch pays out cable beneath the body floor. A universal swivel sheave permits winch line pull in any direction, without limitation.

COMPLETE DESCRIPTION is given in Bulletin No. 118. A copy, with quotation, is yours for the asking.

POWERS-AMERICAN DIVISION
McCABE-POWERS
AUTO BODY COMPANY
5900 No. Broadway • St. Louis 15, Missouri
428 Latham Sq. Bldg. • Oakland 12, Calif.

RM POWER TRANSFORMERS

the benefits of ASA standards

RM* brings you all these benefits

Repetitive Manufacture gives you the economy of a standardized product, yet with optional ratings and accessories sufficient to meet most special needs. Ordering is simpler, shipment is many weeks faster, and prices are up to 8% lower than those of non-standard units.

*RM is the G-E designation for ASA-standardized power transformers 69 kv and below, 501 through 5000 kva single-phase, and through 10,000 kva three-phase.

LOWER PRICE

plus.....

High dielectric strength

from vapor-phase drying which removes entrapped moisture

When you need a transformer in the medium range, order a General Electric Repetitive-Manufacture transformer, and you'll get all the benefits of ASA standards plus many extra advantages that give you better performance, easier handling and less maintenance.

HIGH DIELECTRIC STRENGTH, for example, and better short-circuit protection are assured by an RM production technique called *vapor-phase drying*. Entrapped moisture, if left in the coil assemblies, would lower the dielectric strength of the insulation. Later this same moisture could seep out—causing shrinkage, loose windings, and a weakening in short-circuit stress resistance.

Vapor-phase drying removes the moisture which is present in the insulation during manufacture. At the new Medium Transformer Plant, all units rated above 15 kv and 2000 kva are given this unique treatment which uses vapor from boiling oil. As shown at left, the hot oil vapor permeates the windings and condenses on the coils—releasing the latent heat of vaporization. It is this heat which warms the windings and insulation to the point where, in combination with a high vacuum, moisture is driven out of the structure and carried away. These "pre-shrunk" windings are then securely tightened into a compact coil stack which will remain tight in service giving maximum resistance to short-circuit stresses.

MANY OTHER BENEFITS result from the advanced methods and processes used in General Electric's new plant at Rome, Georgia. These include a stronger liquid-tight tank from submerged arc welding, superior rust prevention because new Super Melaglyp lasts up to 150% longer, quicker delivery from faster, conveyorized production. Built solely to produce power transformers in the medium transformer range, this plant serves utilities and industries by turning out better products in shorter time. You can get full information about RM power transformers by contacting your nearest G-E Apparatus Sales Office, or by writing for Bulletin GEA-6108 to General Electric Company, Section 422-11, Schenectady 5, New York.

Progress Is Our Most Important Product

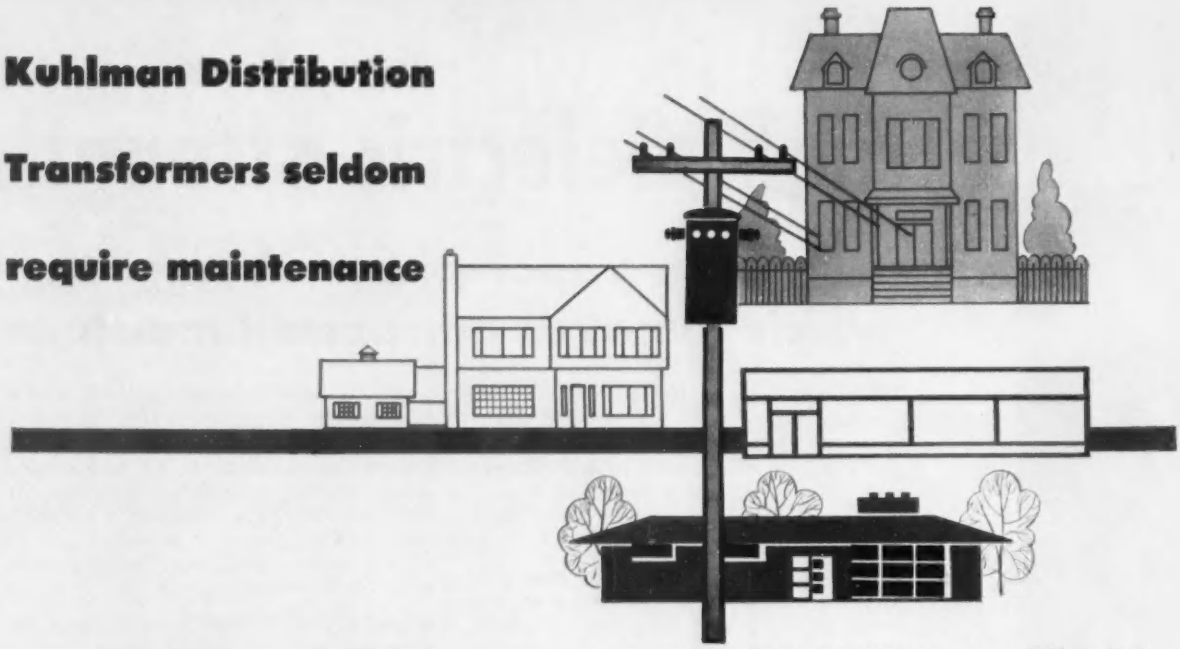
GENERAL ELECTRIC

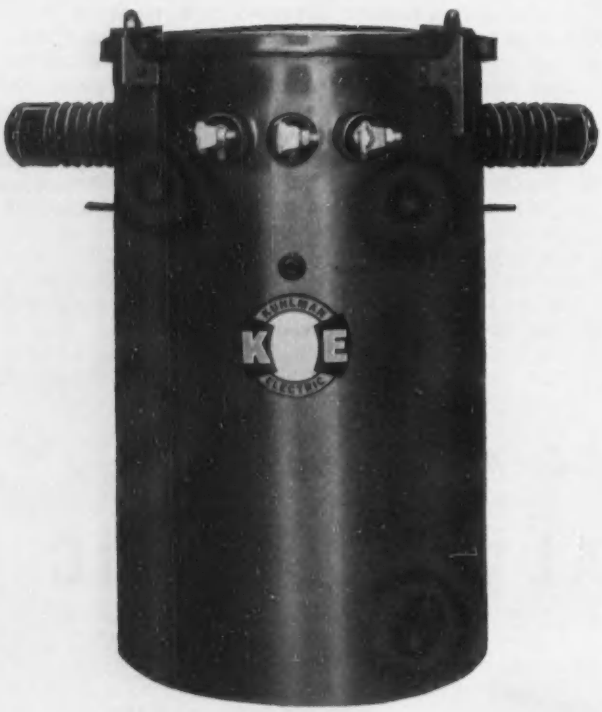
SIMPLIFIED PURCHASING

SHORTER SHIPMENT

G.E.'s NEW ROME, GA., TRANSFORMER PLANT—built specifically to meet the growing trend to standardized power transformers.

Kuhlman Distribution Transformers seldom require maintenance





Because of their design and construction, Kuhlman Distribution Transformers help utilities provide a steady and reliable source of power for American homes at a minimum of maintenance. Construction is sturdy and rigid. Tanks are fabricated of heavy gauge high quality steel, tested, and weatherproofed. For voltages through 4800 V., "Quick-Grip" clamp type insulated bushings simplify installation. Tap changer handle extends above oil level so adjustments can be made easily.

The major portion of Kuhlman pole type Distribution Transformers incorporate the well known Bent Iron Core. This core, permitting the flux path to follow the grain of the steel, utilizes the best qualities of cold-rolled oriented silicon steel. Considerable weight savings, reduction in core loss, and low exciting current result.

By achieving balanced design through the Bent Iron Core and other features, Kuhlman Distribution Transformers are engineered to provide exceptionally good voltage maintenance and high efficiency under varying load conditions. Wide oil ducts permit good oil circulation through the windings, maintaining relatively uniform coil temperatures. Kuhlman Transformers, of course, are vacuum treated to insure against trapped air.

Kuhlman Distribution Transformers are available in single and three phase ratings from 3 to 500 KVA. For complete information, write for Bulletins CS 201, CS 202 and CS 203. Kuhlman also manufactures Power, Dry Type, Saf-T-Kuhl, CSP, Subway and Series Street Lighting Transformers. Write for bulletins on these types as well.

152-T

KUHLMAN

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • Southern Division, CRYSTAL SPRINGS, MISSISSIPPI

EXPORT REPRESENTATIVE: INTERNATIONAL STANDARD ELECTRIC CORP., 15TH FLOOR, 50 CHURCH STREET, N. Y. 7, N. Y. CABLE ADDRESS: MICROPHONE, N. Y.

SIXTY YEARS OF PROGRESS IN THE ELECTRICAL INDUSTRY

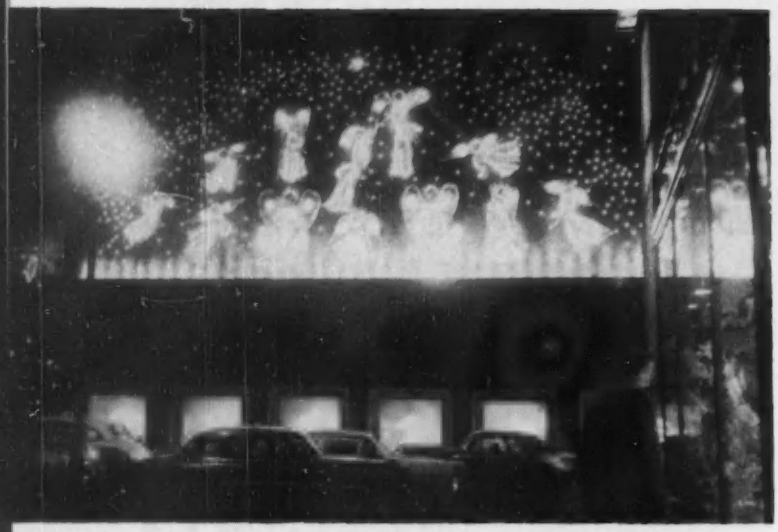
Christmas–Season of Light

Grade school in Northville, Mich., makes an unusual Christmas picture

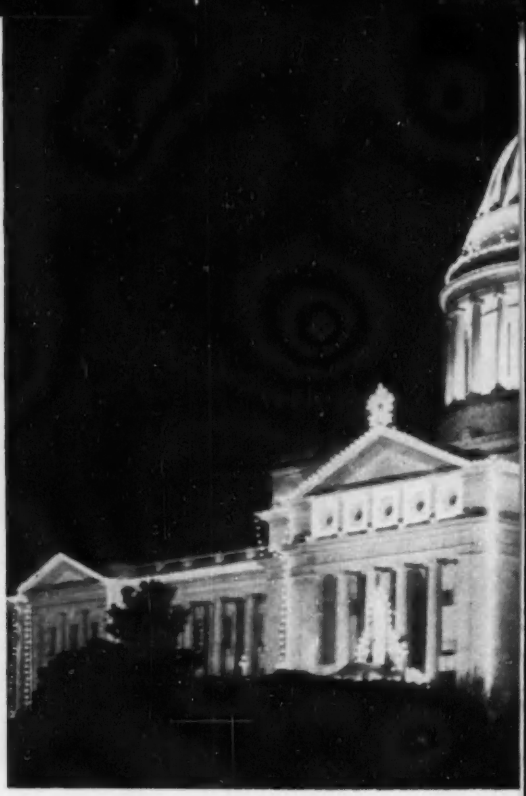
Christmas is the season of light. Today lighting is as much a part of the Christmas scene as the Christmas tree, the holly wreath, and mistletoe. This year in the United States with electric energy available in any amount desired, lighting displays will be bigger, brighter, and more colorful than ever.

On the following pages are some of the displays set up early enough to be photographed for this issue. These pictures do not do justice to the displays themselves. Even in four colors the beauties of light are hard to reproduce.

But these examples do give some idea of how light is being applied this Christmas season. They do indicate that there is a place for Christmas lighting not only in the home but also in the store, the school, the public building, the park, and in the plant or factory. And they do show how modern lighting equipment can be used.



ANGELS make a glittering display over Fifth Avenue department store in N.Y.C.



STATE CAPITOL in Little Rock, has dramatic look with lights turned on

The Whole Country Lights Up for

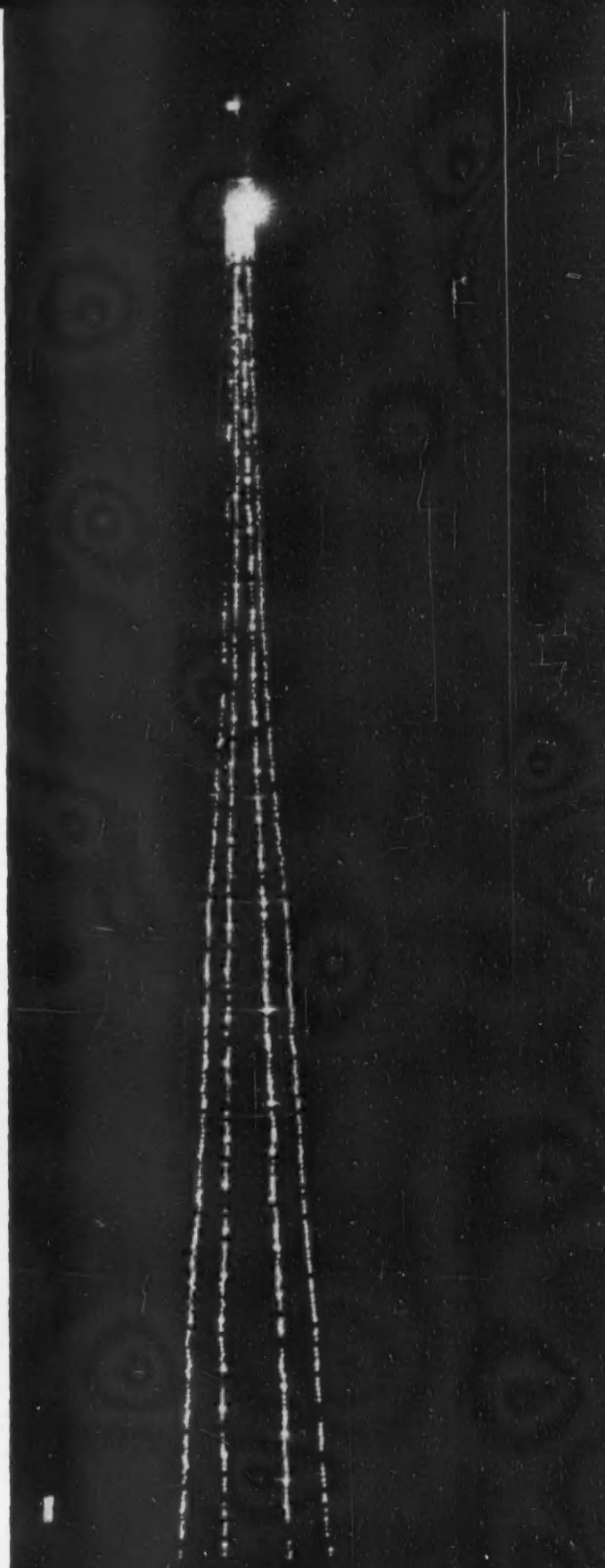
ALBUM OF SONGS is theme at GE's Nela Park

BIG TREE is traditional for Rockefeller Plaza

the Holiday Season

HOME in Dearborn, Mich., uses lights to set off holiday decorations

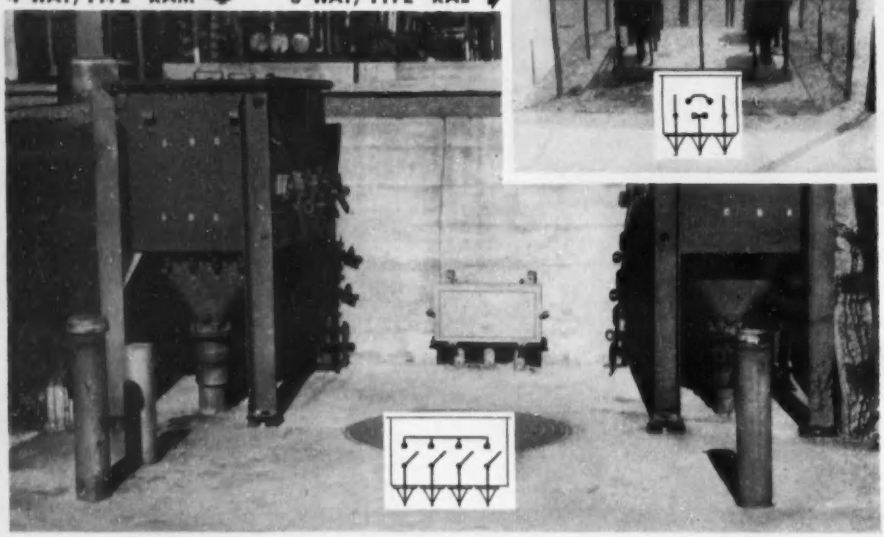
TV TOWER in Seattle stands 1,000 ft high and is decorated with 1,500 lights



CABLE SYSTEM FLEXIBILITY AVOIDS COSTLY SHUTDOWNS IN LARGE INDUSTRIAL PLANTS

15,000 VOLT, 400 AMPERE FULL LOAD BREAK OIL SWITCHES PROVIDE SAFE SECTIONALIZATION OF CABLE SYSTEM IN A LARGE OIL REFINERY.

4 WAY, TYPE "RAM" ➡ 3 WAY, TYPE "RAL" ➡



Adequate flexibility has become very important in recent years as the use of underground cable systems has increased. While outages on cable systems are infrequent, the length of time on such outages may be long enough to cause considerable inconvenience.

With "RA" switches located at strategic points in cable circuits to provide flexibility, a system can be so arranged that important loads will have an alternate source of power immediately available.

Since their introduction in 1928, Type "RA" switches have had a trouble-free operating record which fully justifies their use as load break disconnects for single or multiple circuits. They are safe and reliable, combining simplicity with economy in construction, installation, and maintenance. They will operate properly after long periods of inactivity to provide fast and convenient isolation of cable sections in case of trouble and to permit rapid rerouting of circuits to materially reduce losses normally incurred through electric service interruptions. Exposure to weather extremes or complete submersion for prolonged periods will not affect prompt and safe operation when necessary. They are water-, oil-, and air-tight.

Write us for Series "DB" bulletins or get in touch with our nearest representative for further information. We will be glad to help you apply Type "RA" oil switches to your distribution system.

G&W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Illinois
Representatives in principal cities of U.S.A.
In Canada—Powerlite Devices, Ltd., Toronto, Montreal & Vancouver

G&W

Ad No. D547

Panelists Odell, Griswold and Stringham (l to r) analyze tactics following discussion

Women Declare War on Management Policies

● War was declared on the industry's public relations, advertising, and management policies when an all-woman panel moved in on the Region 2 meeting of the Public Utilities Advertising Association held Dec. 2-3 in New York.

Key targets under attack were the industry's unglamorous ads, its public power fight, and neglect of talented feminine resources.

Directing field operations were these feminine strategists: Mrs Denny Griswold, editor and publisher, "Public Relations News", Mrs. Varick V. W. Stringham, homemaker, Fishkill Plains, N. Y., and Mrs Fred Odell, homemaker, Hackettstown, N. J. Moderator of top level talks was Clara H. Zillessen, past president of PUAA and retired advertising manager of Philadelphia Electric Co.

Electrical World went to the scene of the siege to get a first-hand report. The field communique reads this way:

After an introduction by Planning Committee Chairman Vernon E. Shepherd of Central Hudson Gas & Electric Corp, Moderator Zillessen took to the offensive.

In emphasizing the importance of women in purchasing, Moderator Zillessen said that in 90% of the

V. E. Shepherd congratulates Miss Zillessen after talks. President Westin completes trio

Women: Public Relations Ambassadors?

cases, women are the decisive factor. She noted that in any selling approach, the warm and emotional nature of women should be considered. Furthermore, the utilities should consider that women are not inferior or superior, but different. Something for the utilities to mull over was her declaration that despite illogical feminine reasoning, women usually are right and come up with right answers.

Women—'Potent Public'

To maintain a sustained attack, Moderator Zillessen transferred the command to Mrs Griswold. Since women are a "potent public," Mrs Griswold wished that the utilities would do more with their advertising. After citing magazines, newspapers, and public relations as direct channels for reaching women, she said that many of the utilities overlook reports to stockholders as another communication opportunity.

"Why don't you make a better public relations ambassador of the women?" Mrs Griswold inquired. Sometimes she is the only family contact with the utility. After all, she pays the bills, Mrs Griswold added.

Succeeding Mrs Griswold was Mrs Stringham, a homemaker who lives on a 412-acre dairy farm near Poughkeepsie, N. Y. Mrs Stringham, who has a daughter and son, admitted she knew very little about advertising, but she knew which type of advertisement influenced her to make a purchase. She revealed that an advertisement which tells you "it" can do something —such as "it can bake"—is the one which gets her approval.

In an analysis of utility ads, Mrs Stringham said it was nice that water heater ads pointed out that electricity costs were low, but they failed to mention water costs. Another type ad which Mrs Stringham commented on was the one claiming "husbands are three times sunny" because they took a bath or shower with water heated by an electric water heater.

"Women are not taken in by that type (of advertising)," Mrs Stringham declared, with a smile. She said, "They (the women) would like plain facts." She made this suggestion: "Stop using superlatives."

Mrs Stringham topped off her advertising analysis with a few compliments. She thought the (utility) advertising was wonderful and ads were improving all the time. She said, "You are not content with the best you have done in the past and you are pushing ahead to a high goal. In fact, if your advertising weren't good, I wouldn't be loaded up with such (appliance) equipment in my house."

Successor to Mrs Stringham was Mrs Odell, a mother of four children. Mrs Odell, who admits she would rather put money into appliances than fine linens, revealed that she likes information ads, and cartoon and demonstration ads. Advertisements she dislikes are the "free come-ons." The New Jersey homemaker said, "They insult your intelligence."

Instead, Mrs Odell suggested, "She would prefer to have the appliance price cut instead of getting a free gift or prize."

LDJ TV Show

The panel was asked by PUAA Pres Fred Westin what its reaction was to the Light's Diamond Jubilee television show. The answers follow:

Mrs Odell: "It was nice. I enjoyed it much more than some other shows packed with advertising."

Mrs Griswold: "Light's Diamond Jubilee was a magnificent inspiration of intrafraternal spirit in the utility industry. A magnificent demonstration of what can be accomplished when industry gets together."

Mrs Stringham: "I enjoyed it very much. It was magnificently portrayed, educational, and good for the children. It had an appeal for everyone in the family."

The panel was asked what impact public power is making on women? The answers follow:

Mrs Odell: "Anything in private enterprise good for business and the country is good for every family in the country."

Mrs Stringham: "I am scared to death of government controls. I am for private enterprise."

Mrs Griswold: She was glad the homemakers understood what was asked and the portent and dynamite in the question. She continued: "But, the public relations people have a long way to go before they get the private power message over. We haven't gotten there because you haven't told it to each of us in terms of our personal state. A lot is being done, but I don't think you have done enough. There is a huge gap between the 'yak yak' and actual doing and acting to get that understanding across. This is an important undertaking. Make it personal and continuing."

In elaborating further, Mrs Griswold said, to reach the people on such things as taxes, an emotional tie is important. She said it should be a personal tie at their level and it doesn't mean going down, but at their level. There should be deeper, wider penetration. You are not getting there, she emphasized.

Moderator Zillessen added that "You (the industry) are doing an excellent job (on the public power issue), but have not gotten down to the mass men and women. You have never been in the women's magazines and magazines in the super market. Get down to women of low incomes. Get to the mass of women you haven't begun to reach."

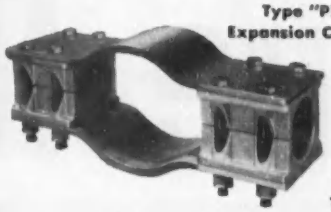
Talents Neglected

Moderator Zillessen said that although the industry uses women in accounting departments and in secretarial posts, utilities are neglecting women on the management level. She noted there is a whole crop of younger women trained to cope with what other women want. "You (the industry) need their assistance in advertising, marketing, selling, promotion, and public relations, and in writing your annual reports," she added.

In referring to store displays and arrangements of appliances—such as lamps and ranges—Moderator Zillessen said "You haven't been using imagination when dealing with women." Furthermore, she added, "You haven't invested your advertising with glamour."

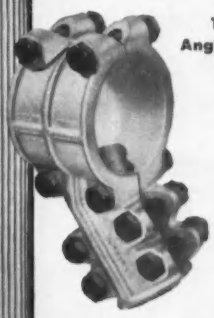
In summing up the panel's unconditional surrender terms on public relations and management policies, Moderator Zillessen asked the utilities to weigh these factors: (1) Women are not inferior or superior, but different, and (2) utilities should have women on a management or executive level.

Type "PXPL"
Expansion Connector



Type "TU"
T-Connector

Type "FTE"
Angle T-Connector



Type "SL"
Stud Connector

Type "FTU"
T-Connector

DELTA-STAR'S new, complete Power Connector Catalog

Offering power connectors for every application—for use with copper and aluminum conductors

Whatever your connector needs may be, this new Power Connector Catalog has the proper fitting listed.

The catalog is compiled in ten sections. It includes an extensive Data Section to assist you in estimating, planning and engineering for future requirements. This section also contains tables, charts, technical articles and much additional information for every-day engineering use.

Other sections present tubing to tubing connectors, cable to cable, tubing to cable, tube or cable to bar, square tubing, flexible connectors, grounding and stud connectors, and terminal lugs.

A copy of this NEW DELTA-STAR Power Connector Catalog is yours for the asking. A letter on your company stationery to the factory or nearest Delta-Star representative, will assure your receiving a copy.

Delta-Star Power Connectors Meet Rigid Service Requirements

The cast-to-size connector principle, pioneered by Delta-Star, provides exceptional gripping action and assures positive electrical connection. Use of strong alloys and large bolts contribute to connector life. Simplified design assures ease of installation.

DELTA-STAR ELECTRIC DIVISION

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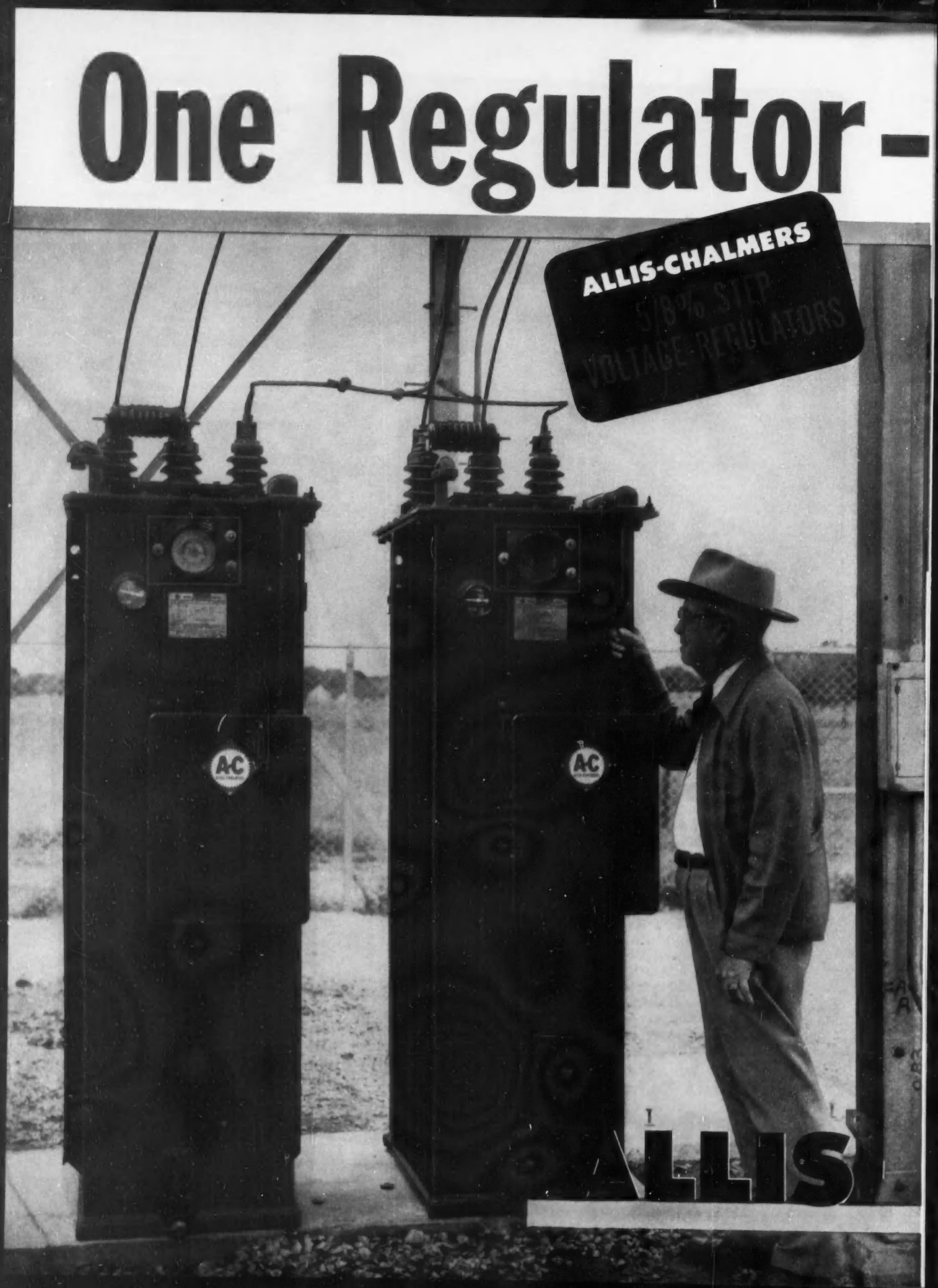
One Regulator –



5 RATINGS

Vari-Amp feature on single-phase power regulators provides flexibility for system growth

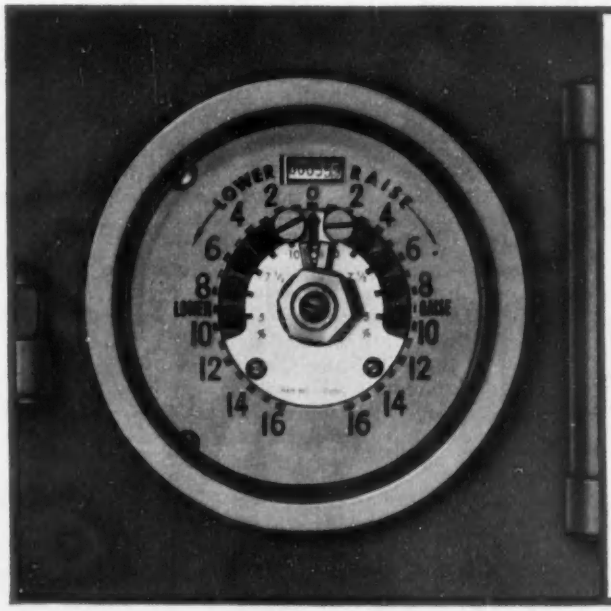
YOU GET FIVE CURRENT RATINGS and five ranges of regulation on a single Allis-Chalmers single-phase power regulator equipped with the *Vari-Amp* feature. Here's an example: a 200-amp single-phase power regulator can be operated at any of the following ratings:

200 amps—20% range **267 amps—15% range**
229 amps—17½% range **320 amps—12½% range**
400 amps—10% range

This means initial cost can be reduced in most cases. And, when loads increase, you can decrease range of regulation in proportion — instead of slicing ranges in half, as with all other regulators. Extra short-circuit capacity is available, too.

The *Vari-Amp* feature also permits unequal range of operation. Under certain conditions you can get full 10% buck even at the higher ratings. It will pay you to get all the facts. Consult your nearby Allis-Chalmers office or write Allis-Chalmers, Milwaukee 1, Wis., for Bulletin 01B6065C.

A-4459



It's This Easy to Change Ratings

3 Simple Steps!

1 **OPEN INDICATOR WINDOW**

2 **PLACE LIMIT SWITCH PINS IN DESIRED POSITIONS**

3 **CLOSE INDICATOR WINDOW**

CHALMERS

A-C ALLIS CHALMERS

Originators of ⅝% Step Regulation

This miniature 2-Way GOABS installation shows how the vertical phase spacing of the GOABS permits time and money saving one-pole mounting.

"GOABS can save you 25% in installation costs over conventional air break switches"

Says L. R. (Les) Crane, *Manager of Sales; Switching Equipment, A. B. Chance Company*

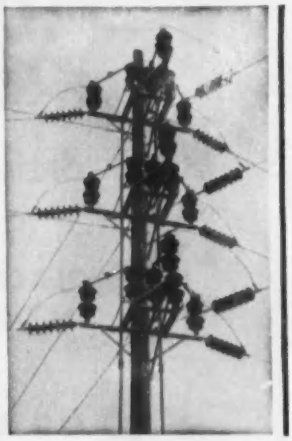
Many users of GOABS (Gang Operated Air Break Switches) report savings of at least 25% in installed costs compared to conventional type air break switches. Such savings are accomplished because GOABS mount on a single pole. This eliminates the need for multi-pole structures and reduces installation time to approximately one fourth of the time required for conventional installations.

Because of their vertical phase spacing and one-pole mounting, GOABS are convenient and economical to install at any tap point, particularly where multi-pole construction is undesirable or impossible; or where a tap is to be made from a vertically spaced circuit, as one circuit of a double circuit steel tower line.

You can get GOABS in 600 amperes, 15, 23, 34.5, 46, and 69 KV ratings.

Requires minimum right of way

Substation switching, loop interconnections or sectionalizing can be accomplished from a single switching point by the GOABS. With the GOABS you eliminate the need for costly extra real estate needed as right of way for conventional air break group operated switches mounted on H-frame structures. Investigate the GOABS today. They are convenient and economical to install at any tap point and are a real trouble-saver for installations where land costs or space limitations prohibit H-frame construction.



Saves valuable line crew time

GOABS are easy to install. Each complete phase of the switch is pulled up as a unit and bolted to the pole. No assembly is necessary on the pole. Mounting the switches on a single pole requires far less hardware and eliminates so many extra operations that expensive line crew time for installation is reduced to one fourth of that normally required for multi-pole structures. A GOABS installation is easy to maintain, too—the vertical phase separation provides 180° free climbing space for linemen.

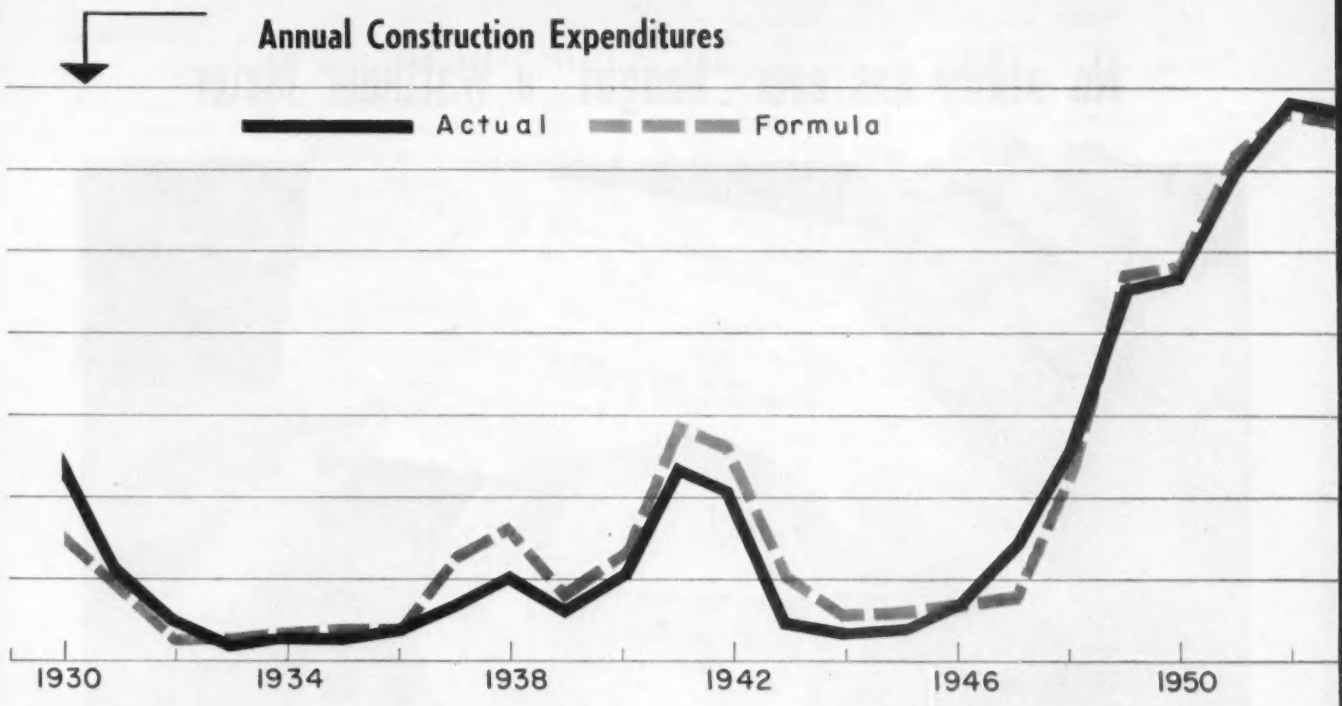
Bulletin 601-A gives complete information. Write for your copy today.

CS54-10

ABC INDUSTRIES

A·B·CHANCE CO·

CENTRALIA, MISSOURI • SAN FRANCISCO, CALIFORNIA



Indices Improve Capital Forecasts

W. J. LYMAN, Vice President, Duquesne Light Co., Pittsburgh, Pa.

A new formula has been developed by Duquesne Light Co to measure the adequacy of construction expenditures. Study of actual expenditures over a 20-year period discloses that four indices give reasonable correlation with the important factors which influence construction expenditures. The new method solves more quickly and accurately the problems associated with the preparation of capital improvement programs.

Indices in the formula for total expenditures in generation, transmission, distribution and general plant are:

1. Generating capability added.
2. Generating capability in service.
3. Construction cost index.
4. Progress factor index.

These four indices are combined to give: Annual Construction Expenditures (1950 price level) = [(Kw gen cap added) × \$300 + (Total installed gen cap.) × \$7] (Construction cost index) (Progress index).

Experience Verifies Method . . . Application of this method to Duquesne Light Co's capital expenditures is plotted as a dash line in the curve above. Actual expenditures are shown for comparison by the solid line. Correlation is seen to be quite close.

This formula has proved very useful in recent years for reviewing capital improvement budgets which must be built up synthetically from specific and blanket projects. It has also assisted the preparation of long-range construction programs, estimates of earnings, and financing forecasts where it is impractical to develop construction budgets.

The construction program finally adopted for any specific year must depend upon proper weighting of many factors. But experience has justified the belief that guides or formulas like this can serve as valuable tools to management. Similar guides could be developed for certain components of the system by using appropriate measures of capacity. But the form shown here determines total system expenditures for generation, transmission, distribution, and general plant.

Generating Additions Index . . . Key factor in total system expenditure is the amount of generating capacity added. Because this capacity is normally built in larger blocks than transmission or distribution, each addition is spread over a three-year period in applying the formula. Fifty percent is applied to the year the unit is completed, 33 1/3% to the preceding year, and 16 2/3% to the subsequent year.

The formula was developed on the basis of 1950 price levels. Unit cost for system additions was found to be \$300 per kw of new generating capability allocated over the three-year period.

(*Continued on page* 27)

No utility has ever "bought" a Watthour Meter

You see, to our way of thinking, a utility does not "buy" watthour meters—it invests in them. Watthour meters are the instruments through which an electric power company's revenue is determined. Don't you agree that purchasing them is really an investment . . . an outlay of capital with the view of obtaining an income or profit?

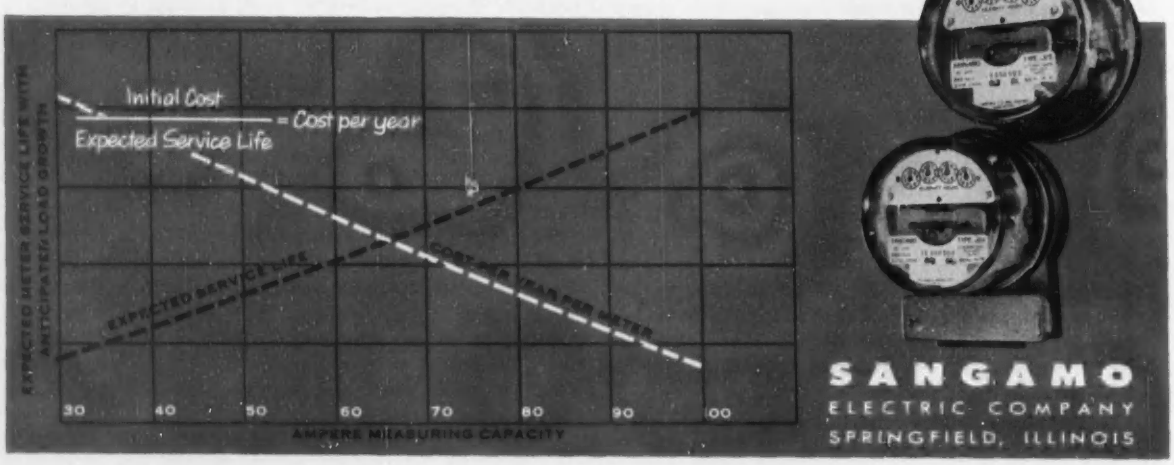
Over two hundred utilities with more than 25,000 customers on their lines have *invested* in nearly ¾ million J2 Meters since last March.

And their investments are protected because the J2 was designed specifically *to meet any future load growth.* If you divide the many years of service you can expect from a J2 Meter into its initial cost, the J2's cost per year is very low.

So when it comes to meters, choose the Sangamo J2 Watthour Meter, the first and finest 15 ampere meter with 100 ampere capacity . . . the meter that protects your investment in metering and lowers investment costs.

the FIRST watthour meter with straight line accuracy up to 100 amperes!

JM54-11



SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

Indices . . .

(*Continued from page* 25)

Generating Capability in Service Index . . . A "constant" term independent of system growth is added to reflect expenditures which must be made for capital replacements, municipal improvements, new business connections, and other items of this type. A unit cost of $7 per kw of total installed generating capability has been found a good measure of this type of expenditure.

Construction Cost Index . . . Wage levels and material prices obviously affect construction cost. But established cost indices provide a satisfactory adjustment for these variables. The index applied in this case is the Handy-Whitman for electric light and power and all steam equipment. The published figure is adjusted to 100 for the base year, 1950, and applied as a multiplier to the sum of capacity additions and system replacements.

Progress Index . . . Use of larger units for additions to system capacity and improvements in the art have tended to cut system incremental expenditures. Examples could be cited to illustrate how recent additions would have cost less per kw than the original plant except for virtual doubling of the construction cost index. Research indicates a value of 2% per year for continuous progress in the art. This adjustment is applied as a multiplier which reduces 2% each year from 100% in 1950.

Method Fits Other Companies . . . Further verification of this formula has been achieved by testing it on the construction expenditures of six other utilities. The table below compares the total requirement estimated by the formula with their actual expenditures and forecasts over a period of years:

Company	Ratio of Formula to Actual
B (1947-54)	101%
C (1952-54)	107%
D (1952-54)	93%
E (1952-56)	109%
F (1952-55)	86%
G (1952-54)	68%
Average	94%

MEETINGS CALENDAR

NORTHEASTERN WEED CONTROL CONFERENCE
Annual Meeting, New Yorker Hotel, New York, Jan. 5-7, 1955.

***PUBLIC INFORMATION PROGRAM**
West North Central Region, Martin Hotel, Sioux City, Iowa, Jan. 6; Workshop Conference Committee, Blackstone Hotel, Chicago, Jan. 14; Mid-Atlantic Region, Seaview Country Club, Absecon, N. J., Jan. 21, 1955.

***EDISON ELECTRIC INSTITUTE**
Industrial Relations Committee, EEI Headquarters, New York, Jan. 20; Power and Heating Committee, Atlanta Biltmore Hotel, Atlanta, Ga., Jan. 31-Feb. 1; Prime Movers Committee, Grand Hotel, Mobile, Ala., Jan. 31-Feb. 1; Home Service Committee, Washington, D. C., Feb. 4-5; Accident Prevention Committee, Shoreham Hotel, Washington, D. C., Feb. 9-10; Transmission and Distribution Committee, Shoreham Hotel, Washington, D. C., Feb. 10-11; Industrial Relations Committee in conjunction with AGA at AMA Mid-Winter Personnel Conference, Palmer House, Chicago, Feb. 14; Electrical Equipment Committee, Deshler Hilton Hotel, Columbus, Ohio, Feb. 14-15; Commercial Electric Space Heating and Air Conditioning Committee, St. Louis, Feb. 17-18; Residential Promotion Committee, New York, Feb. 17-18; Accounting Conference, Planning Edgewater Beach Hotel, Chicago, Feb. 17-18; 1st Street Tree and Utility Conference, co-sponsored with EEI Transmission and Distribution Committee and Street Lighting Committee of Illuminating Engineering Society, Wade Park Manor, Cleveland, March 3-5, 1955.

ELECTRICAL EQUIPMENT REPRESENTATIVES ASSOCIATION
Annual Meeting, Breakers, Palm Beach, Fla., Jan. 10-12, 1955.

NATIONAL ASSOCIATION OF PURCHASING AGENTS
Third Region, Jefferson Hotel, St. Louis, Jan. 13-14; 24th Annual Mid-Winter Conference, Public Utility Buyers' Group, Shamrock Hotel, Houston, Tex., Feb. 13-15, 1955.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
High Frequency Measurement Conference, Hotel Statler, Washington, D. C., Jan. 17-19; Winter General Meeting, Hotel Statler, New York, Jan. 31-Feb. 4; Utilization of Aluminum Conference, William Penn Hotel, Pittsburg, March 15-17, 1955.

DOBLE ENGINEERING CONFERENCE
22nd Annual Meeting, Sheraton Plaza Hotel, Boston, Jan. 24-28, 1955.

CANADIAN ELECTRICAL ASSOCIATION
Eastern Zone, All Divisions, Sheraton-Brock Hotel, Niagara Falls, Ont., Jan. 25-28; Western Zone, All Divisions, Bessborough Hotel, Saskatoon, Sask., March 7-9, 1955.

PACIFIC COAST ELECTRICAL ASSOCIATION
Business Development Section, Hotel California, Fresno, Calif., Jan. 27-28; Conference on Electronic Integrated Data Processing, Hotel Statler, Los Angeles, Feb. 23-24; Engineering and Operating Section Conference, Hotel Huntington, Pasadena, Calif., March 7-8, 1955.

MISSOURI VALLEY ELECTRIC ASSOCIATION
Industrial and Commercial Sales Conference, President Hotel, Kansas City, Mo., Feb. 3-4; Engineering Conference, President Hotel, Kansas City, Mo., March 23-25, 1955.

NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION
Annual Meeting, Convention Hall, Atlantic City, N. J., Feb. 14-17, 1955.

PENNSYLVANIA ELECTRIC ASSOCIATION
Winter Meeting, Relay Committee, Hotel Roosevelt, Pittsburgh, Feb. 15-16; Winter Meeting, Electrical Equipment Committee, Benjamin Franklin Hotel, Philadelphia, Feb. 17-18; Systems Operation Committee, Abraham Lincoln Hotel, Reading, Pa., Feb. 24-25, 1955.

NATIONAL ADEQUATE WIRING BUREAU
11th Annual Conference, La Salle Hotel, Chicago, Ill., February 24-25, 1955.

SOUTHERN SAFETY CONFERENCE-EXPOSITION
Jung Hotel, New Orleans, La., Feb. 27-March 1, 1955.

ROCKY MOUNTAIN ELECTRICAL LEAGUE
Electric Meter Institute, University of Denver, Denver, Colo., March, 1955.

NORTH CENTRAL ELECTRIC ASSOCIATION
Sales Committee Meeting, Radisson Hotel, Minneapolis, Minn., March 6-9, 1955.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS
Annual Convention, Palmer House, Chicago, March 7-11, 1955.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
Edgewater Beach Hotel, Chicago, March 13-18, 1955.

SOUTHEASTERN ELECTRIC EXCHANGE
Annual Meeting, Boca-Raton Hotel and Club, Boca Raton, Fla., March 21-23, 1955.

OKLAHOMA UTILITIES ASSOCIATION
Annual Convention, Mayo Hotel, Tulsa, Okla., March 24-25, 1955.

CONTROLLERS INSTITUTE OF AMERICA
Southern Conference, Mayo Hotel, Tulsa, Okla., March 25-26, 1955.

AMERICAN POWER CONFERENCE
17th Annual Meeting, Sherman Hotel, Chicago, March 30-31, April 1, 1955.

***ILLUMINATING ENGINEERING SOCIETY**
Southern Regional Conference, Ft. Harrison Hotel, Clearwater, Fla., March 31-April 1; Southwestern Regional Conference, Gunter Hotel, San Antonio, Tex., April 3-5; Southern Pacific Coast Regional Conference, Statler Hotel, Los Angeles, April 14-15; Pacific Northwest Regional Conference, Harrison Hot Springs Hotel, Harrison Lake, B. C., April 25-26, 1955.

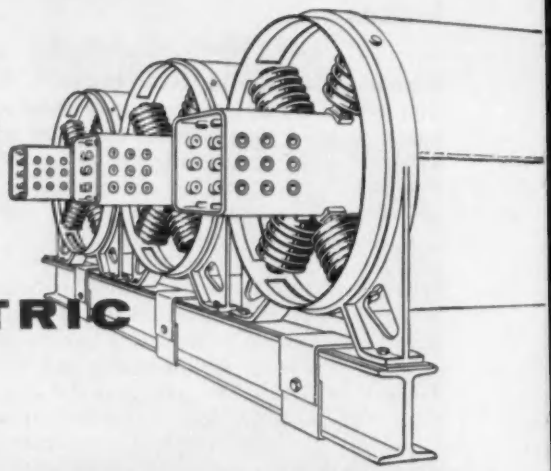
***NATIONAL TELEMETERING CONFERENCE-EXHIBIT**
Sponsored by Institute of Radio Engineers, American Institute of Electrical Engineers, Institute of Aeronautical Sciences, Instrument Society of America, Morrison Hotel, Chicago, May 18-20, 1955.

* Additions this week.

Power on the move

at

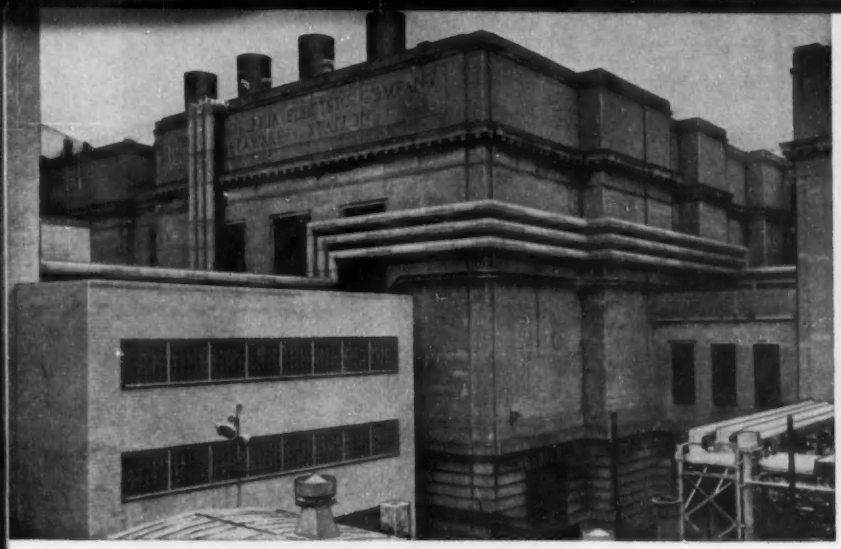
PHILADELPHIA ELECTRIC



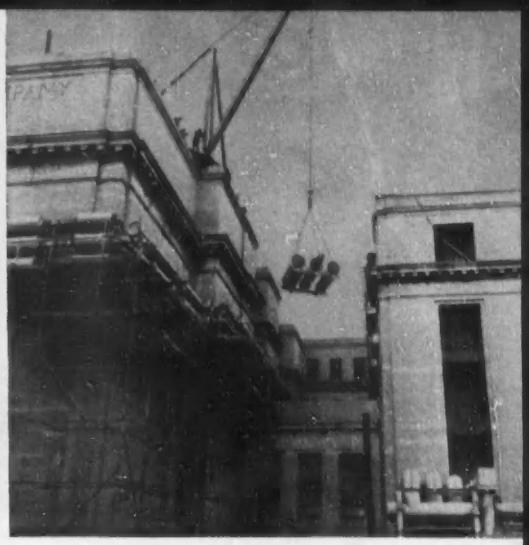
The unprecedented growth of the Delaware Valley is creating huge demands for power—for industry, for homes, for commerce. The sale of electricity, which already has multiplied ten-fold since 1920, is climbing toward a further 50 percent increase before 1960!

As big industry develops and expands, electric power companies have to plan far in advance to be able to supply power for increased requirements. Philadelphia Electric Company is well prepared to meet today's power needs, as well as those in the foreseeable future. A million dollars a week is being spent to provide an undiminished supply of electric power for "the world's greatest industrial area."

Typical of Philadelphia Electric Company's "power for progress" is the modernization and expansion of the vital Delaware Station. PE has made extensive use in this station of I-T-E Isolated Phase Bus.



COMPLETED INSTALLATION showing Isolated Phase Bus running along outside walls and over the roofs. Sections are designed for long, straight runs—or to fit small, cramped quarters—for both inside and outside installation.



DURING INSTALLATION prefabricated sections were delivered to site completely assembled . . . ready to fit in place.

All power generated at *Delaware Station* now feeds through Isolated Phase Bus

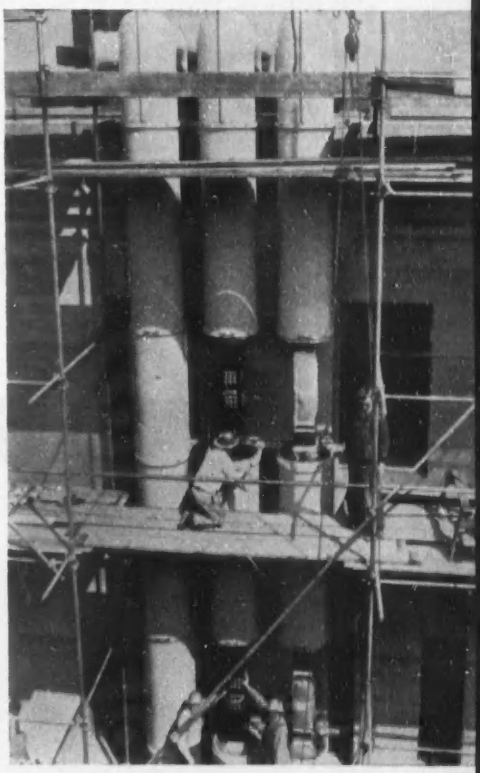
Throughout the station are more than 8700 single-phase feet of I-T-E Isolated Phase Bus. The installation includes long, straight outdoor runs utilizing large assembled units—and short lengths in cramped indoor locations where small pieces are necessary.

In planning the modernization and expansion of Delaware Station, Philadelphia Electric Company engineers decided on the use of I-T-E Isolated Phase Bus because of the following advantages:

Construction is sturdy and compact
Phase-to-phase faults are eliminated
Ground bus can carry a phase-to-ground fault
Porcelain is used to best advantage (in compression only)
High degree of safety afforded to operating personnel
Ease and flexibility of installation cut costs
Minimum maintenance is required

From the start, I-T-E Application Engineers worked in close cooperation with Philadelphia Electric Company engineers. I-T-E prepared comparative estimates, and suggested ways to utilize basic assemblies—thus minimizing investment and delivery time. Factory-matched and -assembled lengths, easily adaptable to both the old and new construction, were delivered *on time*, ready for installation.

For details contact the I-T-E Field Office nearest you. Look in your classified directory under "Electric Equipment."



FACTORY-MATCHED SECTIONS are erected to follow building contours. Conductor connections are made. Alternate welded covers and minimum gasketing assure a tight assembly . . . save erection time.

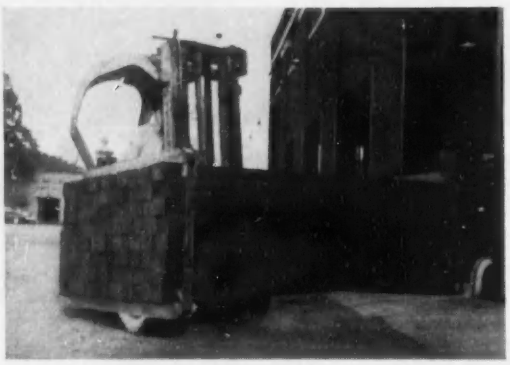
THE SYMBOL OF QUALITY SWITCHGEAR

I-T-E CIRCUIT BREAKER COMPANY

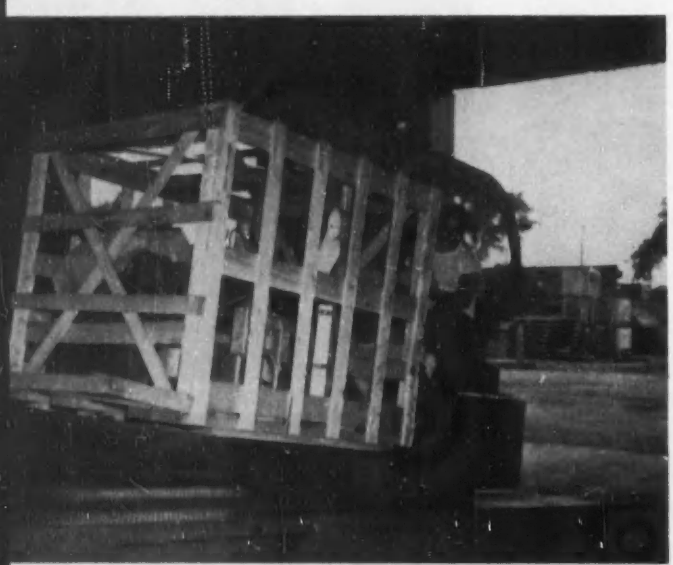
19TH AND HAMILTON STREETS, PHILADELPHIA 30, PA.

ISOLATED PHASE BUS

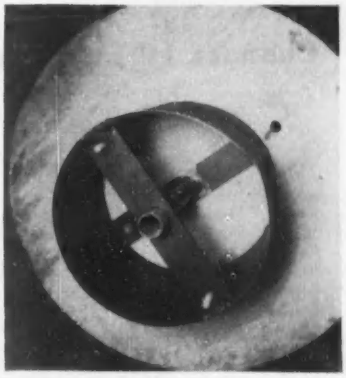
MAGNESIUM ALLOY RAMP (above) is used throughout storage yard and for bringing materials to and from building. Light in weight and balanced on two wheels, it has hydraulic mechanism for adjusting to desired height. A fork-lift truck is shown pushing it where needed. Cross-arms (right) are packaged with steel bands and timbers around each end of bundle. The timbers facilitate picking up and delivery by fork-lift truck of heavy items.



Detroit Edison Employs Gadgets



FORK-LIFT TRUCK (left photo) is used in conjunction with the portable magnesium-alloy ramp for storing materials in the warehouse. One fork is moved into position above and one below the object to be moved, in this instance, crated switched capacitors. Unloading of materials from delivery trucks is also performed by the same combination of fork-lift truck and light-weight ramp, as shown in photo at the right. Truck and ramp have many applications inside the warehouse and in outdoor storage yard where deliveries are made.



WIRE (left) is received in coils 15-in. ID, 32-in. OD, and 11-in. traverse for fitting on demountable reels. Appreciable savings are realized through the elimination of the standard shipping reels for the smaller wire sizes, No. 1/0 and smaller. Coils are handled by a hoist and web belt, as shown. The light-weight demountable reels (above) were made by Detroit Edison with a view to palletizing the wire. One demountable reel is shown (center photo) in the storeroom, wound with aluminum Triplex used for service drops. At far right, the empty reel is shown with the chime removed. The chime is fastened in position by means of winged nuts on the protruding threaded bolts.

to Cut Material Handling Costs

RAKE (left) made of small reinforcing rods with a little bending and welding, have proved helpful in handling many small items kept in containers in the Detroit Edison warehouse. A magnet (photo below) has been found a useful tool for picking up washers and other small items that are dispensed by the pound. The magnet is equipped with a release for dropping the materials. The company claims the fork-lift truck, portable ramp, bundling of crossarms, demountable reels, and gadgets for handling small items improve efficiency in the stores department.

Changes in Capacity Reported to FPC

PLANT ADDITIONS DURING OCTOBER

State	Utility	Plant	Fuel	Capacity (Kw)
Me.	Bangor Hydro Electric Co	Graham Station	S	11,500
Mass.	Boston Edison Co	Edgar	S	81,250
N. Y.	Rockville Center Electric Department	Rockville Center	IC	3,200
Pa.	Duquesne Light Co	Elrama	S	100,000
Ill.	Altamont Municipal Electric Light Plant	Altamont	IC	900
Mich.	Grand Haven Board of Public Works	Grand Haven	IC	3,000
Mich.	Detroit Edison Co	St. Clair	S	125,000
Minn.	Austin Board of Water, Electricity, Gas & Power Commissioners	Austin	S	10,000
Mo.	Missouri Public Service Co	Pleasant Hill	S	22,000
N. D.	Montana-Dakota Utility Co	Mandan	S	25,000
S. D.	Army Corps of Engineers	Ft. Randall	H	80,000
Neb.	Wisner Municipal Electric Light Department	Wisner	IC	645
Kan.	Oberlin Electric Department	Oberlin	IC	775
Del.	Seaford Light & Power Department	Seaford	IC	1,360
W. Va.	Monongahela Power Co	Albright	S	125,000
Fla.	Orlando Utility Commission	Orlando New	S	30,000
Ky.	Tennessee Valley Authority	Shawnee	S	135,000
Tex.	Denton Water & Light Department	Denton	IC	2,500
Nev.	Elko-Lamoille Power Co	Elko	IC	1,500
Calif.	Southern California Edison Co	Redondo Beach	S	156,250

RETIREMENTS

Me.	Rumford Falls Power Co	Island	H	875
Me.	Rumford Falls Power Co	Island	H	1,125
Pa.	Pennsylvania Power & Light Co	Midalle Creek	H	200
Pa.	Pennsylvania Power & Light Co	Raubsville	H	1,440
Pa.	Pennsylvania Power & Light Co	Kulpmont	S	12,000
Pa.	Pennsylvania Power & Light Co	Lykens	S	15,400
Pa.	Pennsylvania Power & Light Co	Williamsport	S	20,000
Mich.	Manton Municipal Light & Power Department	Manton	H	50
Wis.	Wisconsin Power & Light Co	Blackhawk	S	2,500
Minn.	Beltramie Electric Cooperative	Blackduck	IC	487
Neb.	Wisner Municipal Electric Light Department	Wisner	IC	120
Kan.	Oberlin Electric Department	Oberlin	IC	136
Wis.	Duke Power Co	Gregg	H	1,800
Nev.	Elko-Lamoille Power Co	Elko	IC	300

H—Hydro, IC—Internal Combustion, S—Steam.
United States Capacity as of Nov. 1—Hydro, 22,958,652 kw; Internal Combustion, 2,275,534 kw; Steam, 74,773,035 kw; Total, 100,007,221 kw.

New Committee to Review Missouri Basin Resources

A working committee has been established to implement the first large-scale review of the development of water resources and flood control in the Missouri River Basin. The review was requested by the Bureau of Budget.

The group, whose chairman is Brig Gen W. E. Potter, Missouri River Division engineer for Army Corps of Engineers, was ordered to submit first phase of its report to Federal Inter-Agency Committee on Water Resources in Washington by April 15. A final report to the Budget Bureau has been scheduled for submission in September.

The study, to be handled by auxiliary groups under committee's direction, was expected to be co-ordinated with other federal agencies and state organizations which are members of Missouri Basin Inter-Agency Committee.

The group's work calls for studies of projects begun under the Pick-Sloan plan, which was initiated in 1944 for development and control of Missouri River and its tributaries. In addition, all phases of federal activity in the Missouri Basin will be included in the study and all major agencies involved will be represented.

Committee consists of these representatives: Harrell F. Mosbaugh, Department of Interior; Harold E. Engstrom, Department of Agriculture; Glen J. Hopkins, Department of Health, Education, and Welfare; Kenneth G. Tower, Federal Power Commission; Verne Alexander, Department of Commerce; Arnie Solem, Department of Labor; and Potter.

IEC Heater Course Wins Growing Support

In the first three months, 16 utilities already have bought the Industrial Electrification Council's Metal Sheath Heater Course, reports Kenneth Adgate of the Edison Electric Institute.

Originally created by West Penn Power Co's sales department, the course was adapted this summer for general utility use. Its object is to teach electrical specialists in customers' plants the fundamentals of electric heating and how to make simple 500 to 5,000-w electric heater installations without outside help.

Philadelphia Electric Co, and Atlantic City Electric Co now have schools in progress. New York State Electric & Gas Corp has finished the course at Binghamton, but plans to repeat it at some of the largest cities in the company's area.

Other utilities that have bought the course include:

Boston Edison Co, Cleveland Electric Illuminating Co, Connecticut Light & Power Co, Duquesne Light Co, Kansas City (Mo.) Power & Light Co, Mississippi Power & Light Co, Niagara Mohawk Power Corp, Northern States Power Co, Pennsylvania Power & Light Co, Texas Electric Service Co, Union Electric Co of Missouri, and Washington Water Power Co.

L. P. Fries, manager of New York State Electric & Gas Corp's power sales, enthusiastically endorses the course. Citing experience his company has had with it, he told the IEC:

"This program requires a tremendous amount of work to get started, but we recommend it to you. We are getting intimately acquainted with our customers' people, which alone is worth all the effort."

New Ohio Power Unit

Construction of a 225,000-kw generating unit at the Muskingum River Plant of Ohio Power Co near Beverly, Ohio, will cost an estimated $29.6 million. Work will get underway in January with completion scheduled for about December, 1956. This addition will boost Muskingum's generating capability by more than 50%, raising it to 655,000 kw. The plant now has two 215,000-kw generating units.

Now– new design provides LONGER LIFE... LESS MAINTENANCE

The completely redesigned Westinghouse Pole-Type Transformer line for 1955 features major advances in design which offer you 1) more resistance to corrosion, 2) superior tank sealing, 3) greater simplicity in installing, operating and maintaining.

For instance, the *new high dome cover* with its unique, single, captive retaining bolt eliminates all cover clamps, retaining rings and exposed threads subject to corrosion. This construction provides a superior seal . . : facilitates maintenance and inspection.

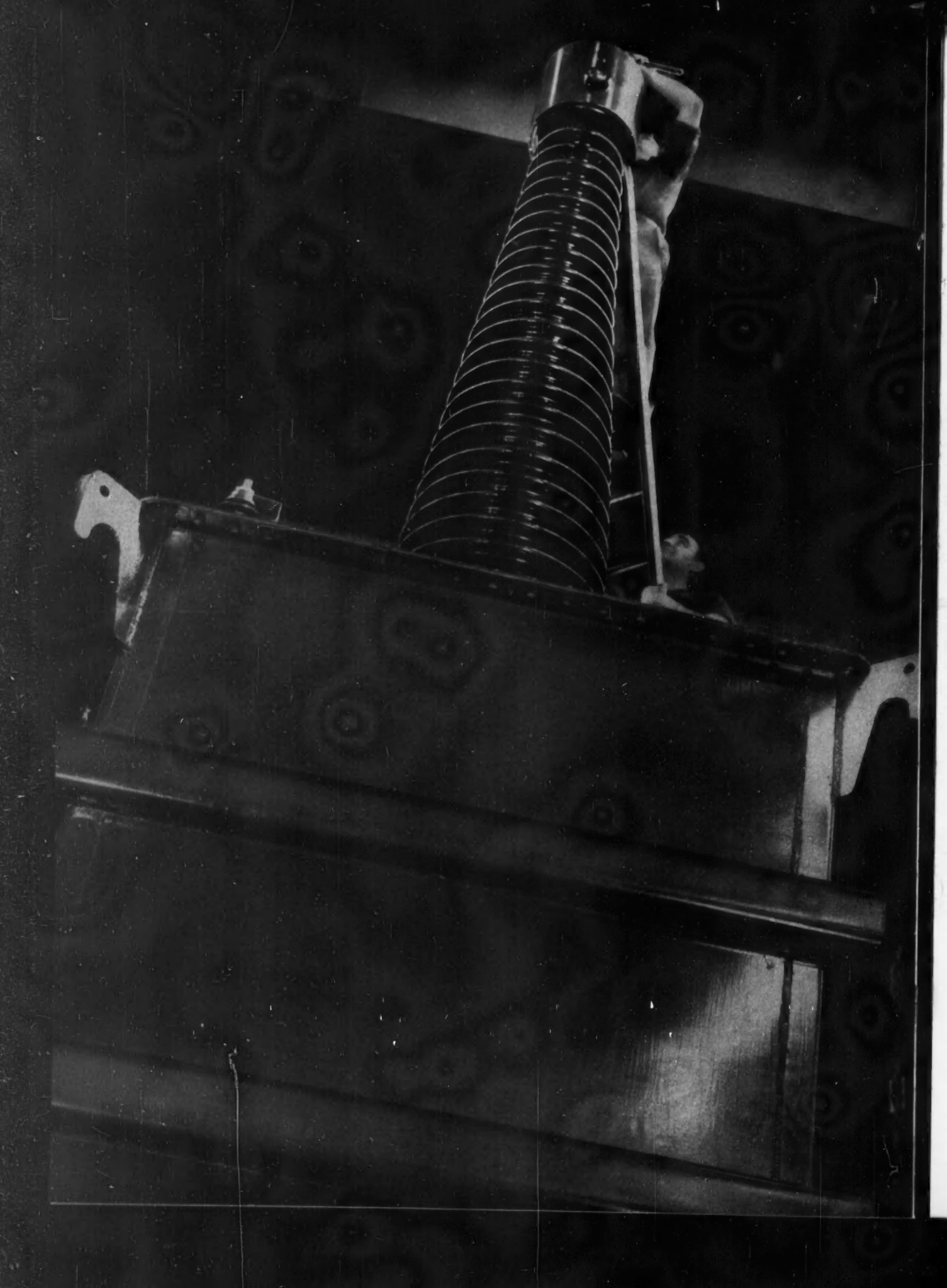
Every one of the new features has similar direct, timesaving, money-saving benefits for you.

If you have not yet received all the details of this outstanding new line, call your nearby Westinghouse Representative now—or write direct to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-70734

YOU CAN BE SURE...IF IT'S Westinghouse

Frank L. Snyder, Westinghouse Vice-President, with four of the transformer types involved in major design improvements.



Helping the industry meet its growing loads

Designing transformers to measure ever higher voltages

"Will it be possible to measure tomorrow's higher voltages on a practical basis?" As recently as one year ago, utility management did not have an answer to that question.

Today, it can be answered—in the affirmative—with assurance. The highest voltage potential transformer ever built—for 330 kv—is tangible evidence.

This tremendous unit would have been even larger—perhaps impractical without the sound basic design made possible by over twenty years of utility co-operation and continuing high-voltage research. This work has resulted in various important developments many of which have been Westinghouse "firsts" for the industry. To name just a few—

Oil-filling under vacuum was first introduced by Westinghouse to assure full impulse strength the moment the units are placed in service. This practice has been accepted as a standard of the industry.

Quality-control impulse testing was another Westinghouse innovation which has been highly successful in improving the reliability of instrument transformers in general.

Hipersil® for transformer cores, still a Westinghouse exclusive, is a highly permeable, grain-oriented silicon steel, which makes possible substantial reductions in transformer size and weight.

All of these research results, plus the vast storehouse of application knowledge accumulated by Westinghouse engineering over the years, have their place in the practical measuring of tomorrow's higher voltages. They are proof of the continuing objective at Westinghouse to provide utilities with equipment which will continue to aid them in successfully meeting their growing loads. J-97181

YOU CAN BE SURE... IF IT'S Westinghouse

Largest potential transformer built!

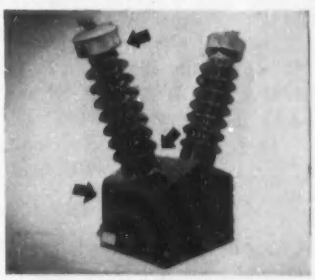
The Westinghouse Type VP potential transformer—the largest ever built—illustrated at left is for operation on a 330-kv, 3-phase, 60-cycle system. It is 26 feet high, weighs 41,000 pounds and covers a projected floor space of 92″ by 88″.

This tremendous unit would have been much larger physically without the basic design features proved in lower rated units and the continuous research into high-voltage applications. In addition, other basic design features include:

Interchangeable bushings

Condenser bushings on VP potential transformers (25 kv and higher) are interchangeable with those used on power transformers of the same voltage class. They give high mechanical strength—high puncture strength—with relatively small size and weight.

Hermetic sealing



Porcelain weather housing of bushings is solder sealed at the cap and flange. High-voltage bushing flanges are welded to the tank. All tank seams are arc welded. The security of all joints of the complete vacuum filled assembly is then proved by an oil-pressure test.

This "hermetically-sealed" construction assures sustained transformer accuracy necessary to the reliable measurement of high voltage at any level.

For more information on the most complete line of instrument transformers on the market, call your nearby Westinghouse representative or write direct to Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

OLIVER T. BUCKLEY

HARRY A. WINNE

Buckley Is Edison Medalist

AIEE reveals retired Bell Lab president is 1954 winner. Recipient of John Fritz award is Winne, former GE executive

American Institute of Electrical Engineers has announced that Dr Oliver T. Buckley, retired president of Bell Telephone Laboratories, Inc, is winner of 1954 Edison Medal. Winner of the 1954 John Fritz Medal is Harry A. Winne, retired vice president of General Electric Co.

Both medals will be presented next February at the Winter General Meeting of AIEE.

Citations . . . Dr Buckley was cited "for his personal contributions to the science and art which have made possible a trans-Atlantic telephone cable; for his wise leadership of a great industrial laboratory; for outstanding services to the government of his country."

Winne was honored "for service to his country in war and peace through his distinguished leadership in the electrical industry."

Dr Buckley has had an active career in electrical engineering as a research physicist, inventor, and executive. He joined Western Electric Co, now Bell Telephone Laboratories, in 1914 as a research physicist. After serving with the U. S. Army Signal Corps during World War I, he returned to Bell Laboratories. He became director of research in 1933, executive vice president in 1936, and president from 1940 to 1950. He was chairman of the board during 1950-51.

AIEE Fellow . . . A fellow of AIEE, Dr Buckley was vice president of the institute from 1946 to 1948. He was a member of the general advisory committee of the Atomic Energy Commission during the period 1948 to 1954.

Winne was graduated from Syracuse University in 1910. Since entering the employment of General Electric he has served as head of steel engineering, manager of steel mill and mining sales, and assistant to the vice president in charge of engineering Then he was successively vice president of engineering, engineering apparatus department, and engineering policy. In May, 1953, he went on special assignments for the company's president, retiring in November of that year.

Participant in A-Field . . . Active in the atomic energy field, Winne during the war handled GE's role in the overall nuclear energy program under General Leslie R. Groves. After the war he was named chairman of General Electric's nuclear energy projects committee.

Winne's honors include the James H. McGraw Award for Electrical Men and 1954 National Society of Professional Engineers Award.

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Chester C. Boesewetter has been named chief engineer of Penn-Union Electric Corp. Boesewetter, an engineering graduate of the Milwaukee School of Engineering and the University of Wisconsin, recently was with the Goodman Manufacturing Co, manufacturer of electrical mining machinery.

Edward J. Rommel has been appointed acting commercial manager of Dayton Power & Light Co. Rommel, an electrical engineer, succeeds **Leonard M. Holmes,** who has retired after more than 21 years' service with the company. Rommel, whose utility experience includes 21 years with Toledo Edison Co, came to Dayton P&L in October, 1950, as an assistant to the commercial manager. Holmes had been manager of the Commercial Division since January, 1947.

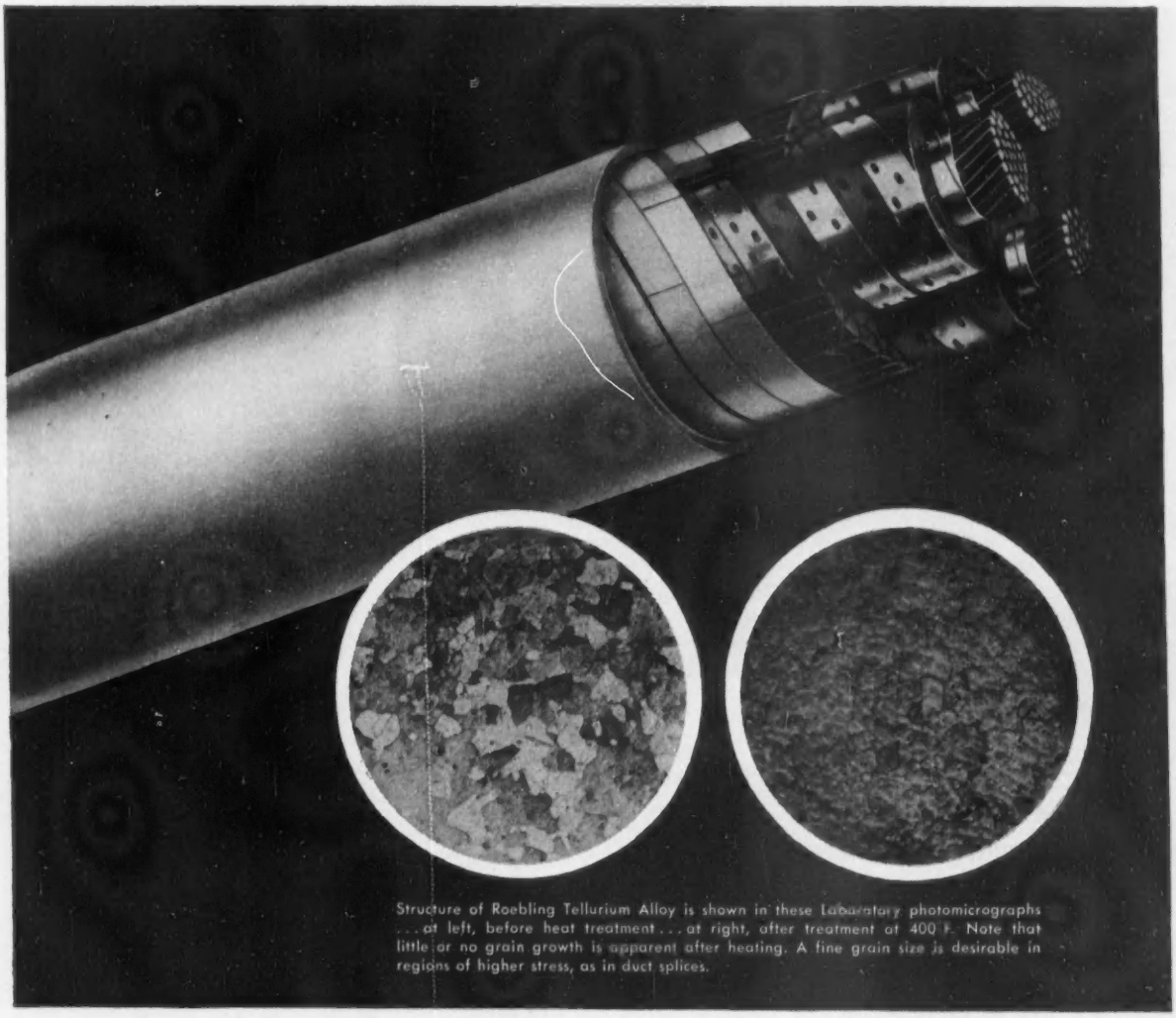
A. A. Osipovich, former chief of transmission design section for Bonneville Power Administration, has established a consulting engineering office in Portland. Osipovich, who before leaving BPA had directed design of towers for the systems new 345-kv towers for lines now under construction, was with the federal power agency for 16 years and before that for five and a half years on the Bonneville Dam design staff.

Henry G. Riter, III, chairman of the board of directors of Copperweld Steel Co and a member of its executive committee, has been elected the 1955 president of the National Association of Manufacturers.

Named a Vice President

Francis J. McNamara, general counsel for Remington Rand, Inc, has been appointed a vice president of the firm. However, McNamara will continue to serve as Remington Rand's general counsel. The newly elected vice president will make his headquarters in Stamford, Conn.

ROEBLING TELLURIUM ALLOY LEAD SHEATH ASSURES FAR LONGER CABLE LIFE



Structure of Roebling Tellurium Alloy is shown in these laboratory photomicrographs . . . at left, before heat treatment . . . at right, after treatment at 400 F. Note that little or no grain growth is apparent after heating. A fine grain size is desirable in regions of higher stress, as in duct splices.

BIGGER LOAD REQUIREMENTS! Higher temperatures! Increased movement of cable during load cycles! Today's best answer to each of these conditions is Roebling Paper Insulated Cable with Tellurium Alloy Lead Sheath*—the Roebling lead alloy that has completely superior resistance to fatigue.

In addition, Tellurium Alloy Lead Sheathed Cable has a lower long-time creep rate . . . high bursting strength . . . remarkable stability under heat application as in duct splicing and wiping. And on top of that, it eliminates need for frequent stop joints or reinforced lead sheath . . . does not require generous expansion bends or large manholes.

Write us now for full information. John A. Roebling's Sons Corporation, Dept. 707, Trenton 2, New Jersey.

*Licensed under Patent 2588095 March 4, 1952 and App. No. 308710, Sept. 9, 1952.

ROEBLING

SUBSIDIARY OF THE COLORADO FUEL AND IRON CORPORATION

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 12225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Baldwin Assumes PUAA Regional Post

Schuyler F. Baldwin (center), director of public relations for Rochester Gas & Electric Corp, is shown above taking gavel from retiring chairman Vernon E. Shepherd of Central Hudson Gas & Electric Corp after he was elected to the post of the regional chairman at the Region 2 meeting of Public Utilities Advertising Association held earlier this month in New York. Onlooker is PUAA Pres Fred Westin of Public Service Electric & Gas Co.

Hotpoint Makes Changes In Marketing Organization

To further strengthen its marketing organization for operations in 1955, Hotpoint Co has made several personnel changes in both the home and field offices.

Dwight R. Anneaux, former manager of utility sales, has been made director of apartment house and builder sales. Replacing Anneaux as head of utilities is J. A. Bell, formerly a regional utility specialist.

David C. Marble, former Chicago district manager, joins the utility department. Marble's former position of district manager in Chicago will be assumed by James E. McCarthy.

David H. Grigsby has been made merchandising manager of ranges and water heaters. He was formerly associated with Coventry, Miller and Olzak, and Zenith Radio Corp.

A. E. Lacey, a former sales promotion manager for General Electric Supply Co, has replaced R. H. Poll as zone manager of the Minneapolis-Milwaukee territory. Poll has been transferred to the Chicago office in the company's purchasing department.

Formerly district manager in Philadelphia, H. B. Cromleigh will take over as builder specialist in the Boston area. V. P. Owen, former zone manager in Seattle, has been advanced to district manager of Philadelphia.

J. T. Burk has been transferred from zone manager in the Philadelphia area to zone manager of direct to dealer sales operations in Toledo.

Two former General Electric Supply Co employees have taken over district posts. M. A. Hoff has been made appliance builder representative covering the Hotpoint Los Angeles and San Francisco districts. Hugh Daley has been named zone manager in the Boston district.

•

J. A. English has been appointed manager of Philadelphia Electric Co's Emergency Procedures Division, a new unit created to review, improve, and establish new emergency operation procedures. English was general superintendent of the company's gas department prior to appointment to his new position.

Edward T. Gushee, vice president of Detroit Edison Co, has been elected president of the American Standards Association.

Fred A. Madgsick, manager of the Champaign service area of Illinois Power Co, is slated to retire Jan. 1, 1955. Madgsick, who has filled the managership for the past 15 years, will be succeeded by **R. B. Campbell,** now assistant manager.

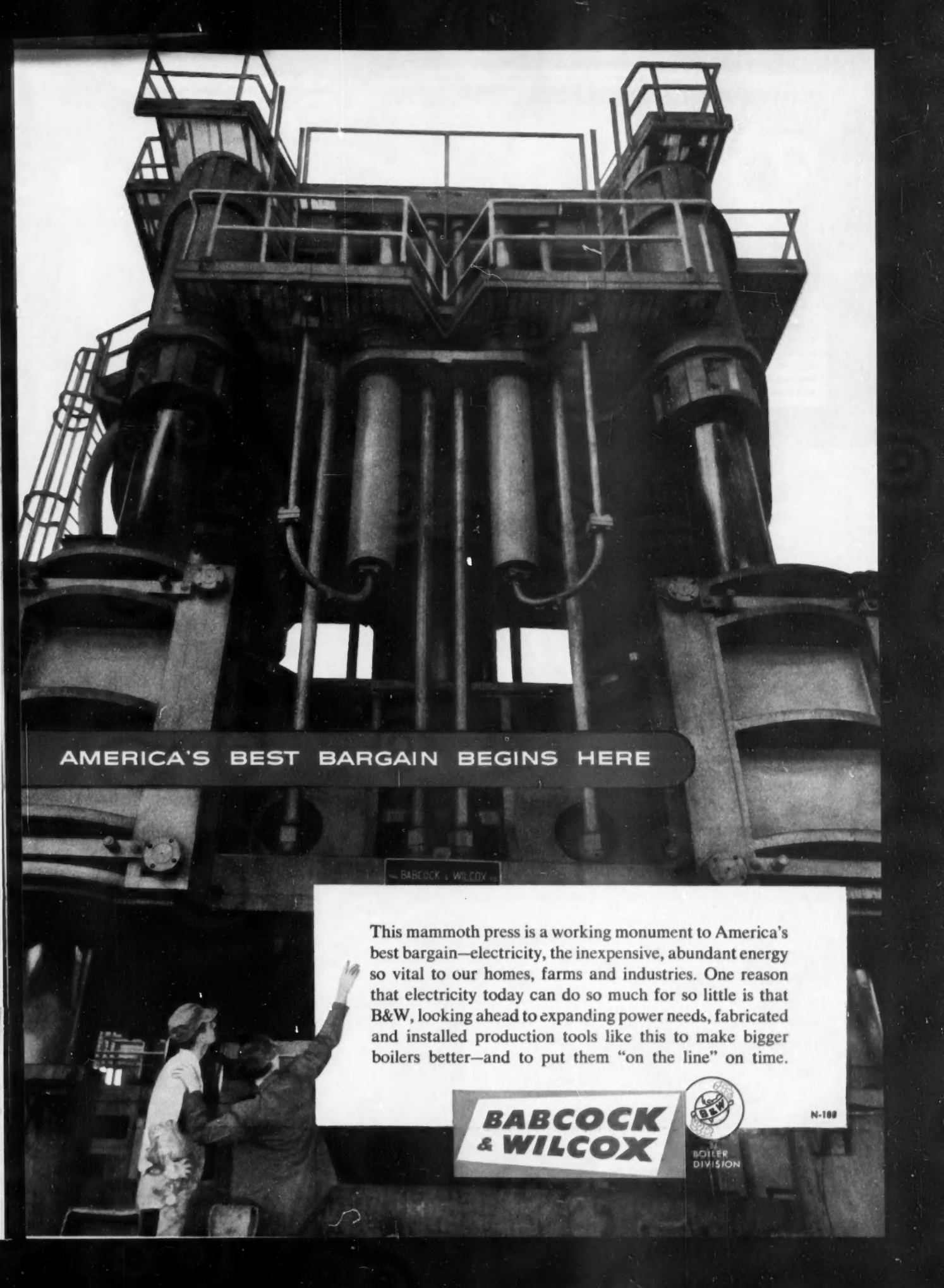
William J. Fadden, Jr, has been appointed chief mechanical engineer of Kuljian Corp, Philadelphia. In another appointment. **Daniel H. Dykins** was made manager of utilities. For a number of years Fadden has been in charge of major Kuljian power plant projects. Dykins has represented Kuljian for nearly ten years in negotiations for both domestic and foreign steam generating stations.

Dr William Firestone has been named to the newly created position of assistant chief engineer of the research department of Motorola's Communications and Electronics Division. Dr Firestone, who now assumes responsibility for specific phases of departmental administration, will also continue in his present post as head of the advanced investigation section of the research department.

Anthony J. Pansini, manager of the meters and distribution department of Long Island Lighting Co, has been elected a fellow in the American Institute of Electrical Engineers.

Gets Executive Post

Grenville B. Ellis has been named executive vice president of Nickel Cadmium Battery Corp, Easthampton, Mass., effective Jan. 1. Prior to joining the firm, Ellis held since 1940 the position of chief of the power sources branch of the U. S. Army Signal Corps, where he was in charge of all research and development in the power sources field.

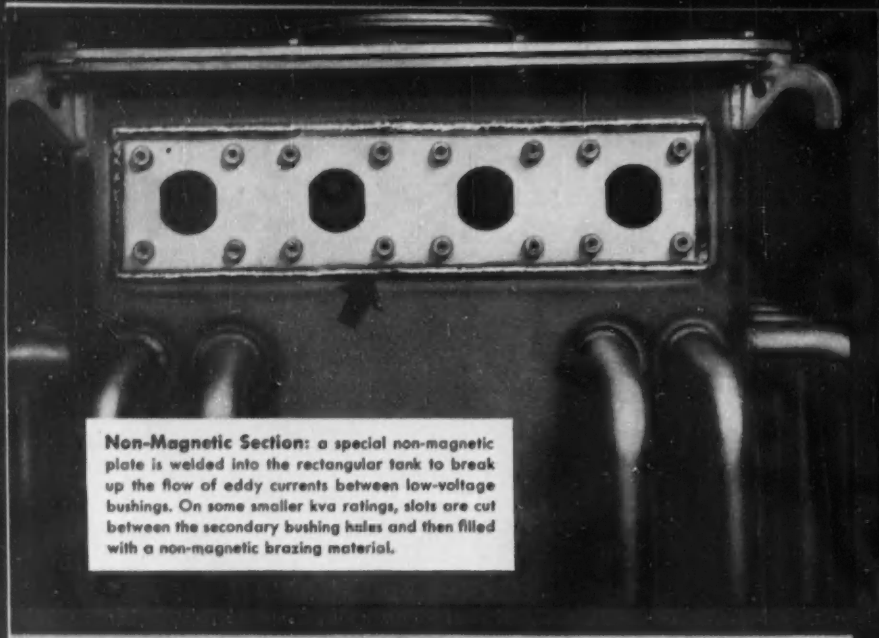


This mammoth press is a working monument to America's best bargain—electricity, the inexpensive, abundant energy so vital to our homes, farms and industries. One reason that electricity today can do so much for so little is that B&W, looking ahead to expanding power needs, fabricated and installed production tools like this to make bigger boilers better—and to put them "on the line" on time.

BABCOCK & WILCOX

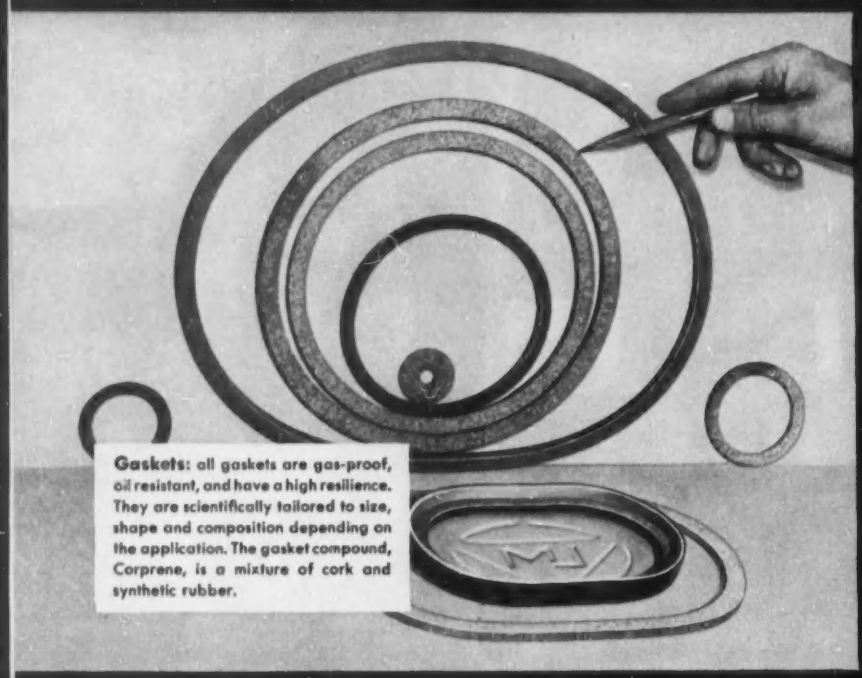
BOILER DIVISION

N-188

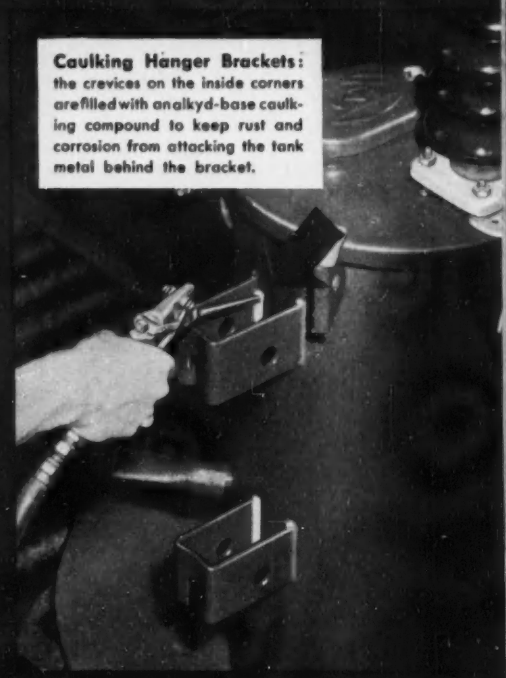


Non-Magnetic Section: a special non-magnetic plate is welded into the rectangular tank to break up the flow of eddy currents between low-voltage bushings. On some smaller kva ratings, slots are cut between the secondary bushing holes and then filled with a non-magnetic brazing material.

Arc-Welded Members: all lifting lugs and hanger brackets are arc-welded to provide maximum strength.



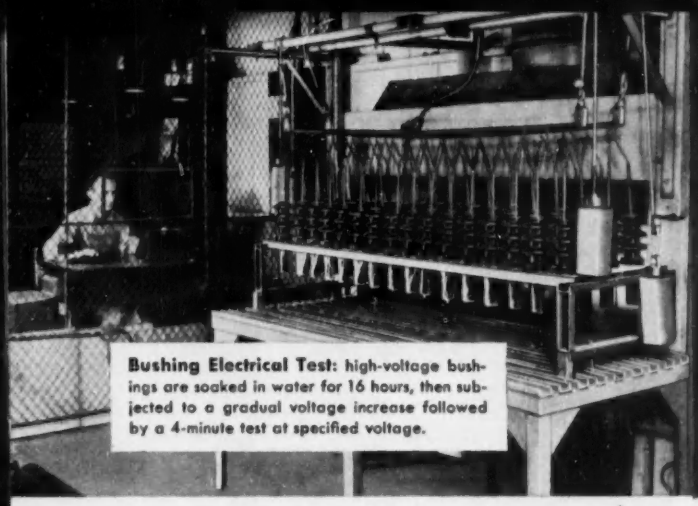
Gaskets: all gaskets are gas-proof, oil resistant, and have a high resilience. They are scientifically tailored to size, shape and composition depending on the application. The gasket compound, Corprene, is a mixture of cork and synthetic rubber.



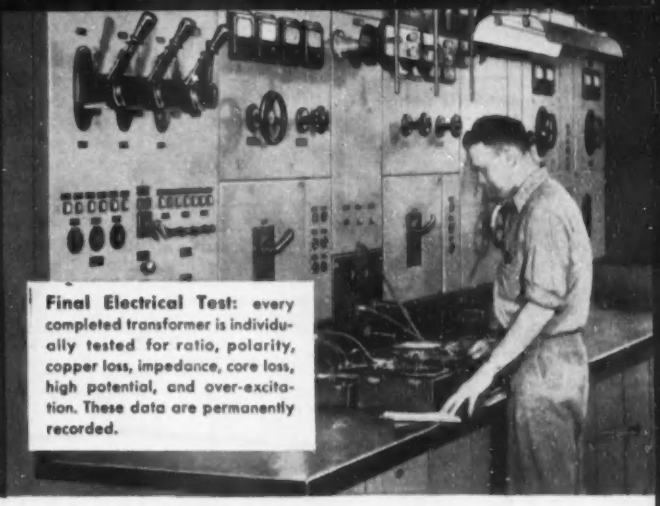
Caulking Hanger Brackets: the crevices on the inside corners are filled with an alkyd-base caulking compound to keep rust and corrosion from attacking the tank metal behind the bracket.

Stainless Steel Bolts: the cover bushings are all secured with stainless steel, rust-proof bolts. You can easily remove or replace the bushings at any time.

Special Lock Screw: the tap changer has a special lock screw with nylon insert which is completely unaffected by vibration.



Bushing Electrical Test: high-voltage bushings are soaked in water for 16 hours, then subjected to a gradual voltage increase followed by a 4-minute test at specified voltage.



Final Electrical Test: every completed transformer is individually tested for ratio, polarity, copper loss, impedance, core loss, high potential, and over-excitation. These data are permanently recorded.

L-M's Round-Wound® Transformers Have

"The Little Things That Count"

By J. G. EVERHART
Chief Engineer
Transformer Division
Line Material Company

L-M Round-Wound transformers offer outstanding performance characteristics which are largely the result of the unique wound core and round coils wound directly onto the core.

In addition to this design advantage, L-M exercises particular care in the many "little things that count."

L-M engineers and production personnel are specialists in distribution transformers. Thus, any problem in the design, manufacture, or application of distribution transformers, regardless of how minor it may seem, merits their consideration and specialized knowledge.

Experience has shown that this attention to the details in design, assembly, inspection, and testing adds appreciably to the service life of the Round-Wound transformer, to its exceptionally low failure rate, and to its over-all performance characteristics.

Get The Whole Story On Round-Wound Transformers

A 16mm. color-sound motion picture film is available for showing to members of your organization, illustrating the construction of L-M Round-Wound transformers and the care taken in "the little things that count." Ask the L-M Field Engineer for complete information, or write Line Material Company, Transformer Division, Zanesville, Ohio (a McGraw Electric Company Division).

Some of the Little Things That Count for the User

COIL:

Each coil is tagged, identifying rating, winder, wire manufacturer . . . assures control for better quality.

Extra low voltage ties . . . give added axial short circuit strength.

Varnish dip . . . provides excellent mechanical strength under short circuit.

Vacuum oil impregnation . . . assures corona-free operation and uniformly high dielectric strength.

TANK:

Everdur cover bolts (large rectangular tank units) . . . eliminate rusting, provide high mechanical strength.

Stainless steel mounting bolts—cover bushings . . . facilitate bushing removal or replacement; no rusting.

Self-locking anchor nuts . . . secure the core and coil assembly against vibration or other accidental loosening.

Scientifically selected Corprene (TM) gaskets... combine gas proofness and oil resistance with proper resilience for quality seal.

Arc-welded lifting lugs and hanger brackets . . . assure positive and permanent strength of load-carrying parts.

Caulked hanger brackets . . . prevent exposed-crevice corrosion.

Non-magnetic slots and plates in tank wall . . . reduce eddy current losses.

Petroleum jelly on secondary spades . . . prevents corrosion.

SMALL TAP CHANGER:

Fiber glass reinforced alkyd resin body . . . lengthens vertical creepage paths from line to ground.

No live parts on top of tap changer . . . increases safety.

Self-aligning line lead knob for hand tightening . . . provides maximum torque with minimum effort. Impossible to cross thread. No tools necessary.

EXTERNALLY OPERATED TAP CHANGER:

"Lifetime" Teflon (TM) shaft seal. Non-corrosive external parts. Positive positioning locking device. Self-aligning, self-wiping contacts. Stainless steel shaft.

All these features eliminate corrosion, prevent binding, assure positive, low-resistance connections, and help provide a long-lasting, smooth-operating mechanism.

TESTING:

Steel and wire acceptance tests and controls. 100% primary bushing electrical test. 100% preliminary core loss test. 100% preliminary coil ratio and polarity test. Core and coil assembly test. Leads and connections mechanically and electrically tested. Casing inspection. Power factor test.

These are examples of in-process quality control leading to over-all quality of a uniformly high level.

Final electrical line test. 100% testing for ratio, polarity, copper loss, impedance, core loss, high potential and over-excitation. Thorough testing of completed unit before shipment is final step in control for better quality.

Test records and data kept permanently on file . . . make complete design and test information always available.

Oil leak test . . . assures oil-tight welds and positive seals and gasketing.

GENERAL:

Terminals tin coated . . . gives low resistance; minimizes galvanic action when aluminum wire is used.

Swaged connections . . . have low resistance; are mechanically secure.

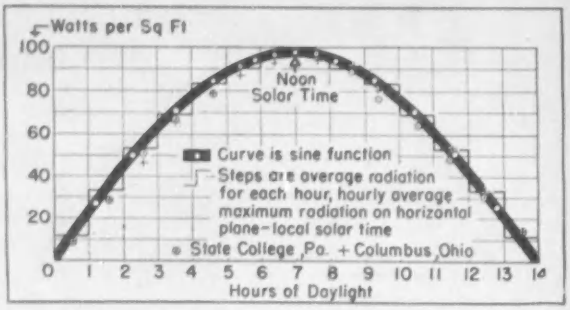
Inspection tags . . . assure complete checking at 4 prime stations coded for identification.

Oil-impregnated, kiln-dried, maple coil support blocks . . . assure high mechanical strength with no possibility of subsequent loosening.

Temporary plastic covers (small units) . . . prevent contamination during fabrication.

ORTO-inhibited oil . . . prevents sludging, increases life expectancy of oil.

LM® LINE MATERIAL Transformers


Watts per Sq Ft
100
80
60
40
20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Noon
Solar Time
Curve is sine function
Steps are average radiation for each hour, hourly average maximum radiation on horizontal plane–local solar time
State College, Pa. + Columbus, Ohio
Hours of Daylight

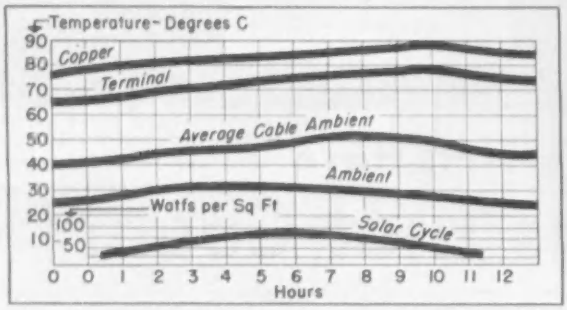
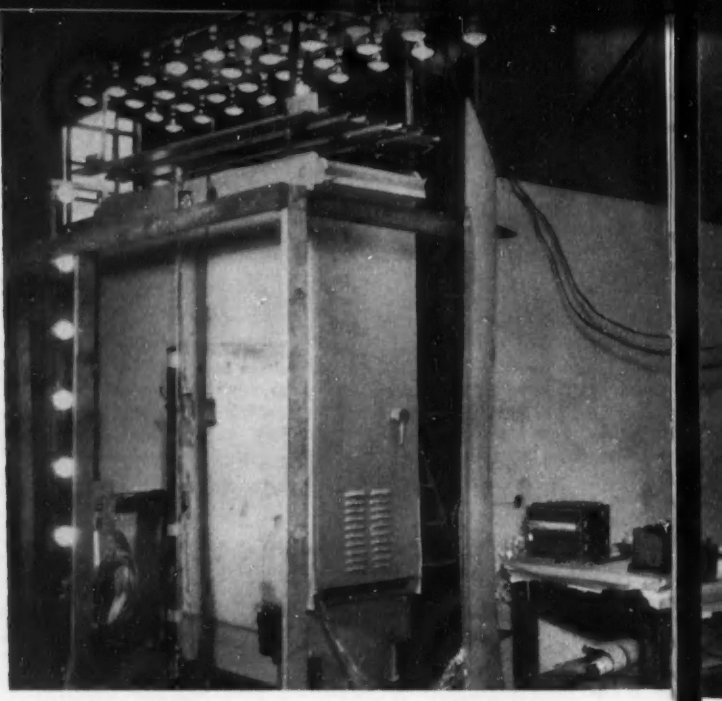


Fig 1—HOURLY HIGHS for 15 June days give solar radiation intensity curve. Tests give lower graph of solar radiation effects on units



LABORATORY TESTS in which solar radiation was simulated with infra-red lamps yielded the data summarized in lower graph in Fig. 1

Daily Temperature Limits Loading

Solar contribution reaches 2,000w on typical 5-kw unit;

H. B. WORTMAN, Switchgear Division, Westinghouse Electric Corp, East Pittsburgh, Pa.

Solar radiation is the largest single contributor to the total temperature of outdoor metalclad switchgear and limits loading. The peak solar contribution may be as high as 2,000 w on a typical 5-kv unit where electrical losses, the next highest contributor, generate approximately 1,300 w when the unit is fully loaded.

Indoor metalclad switchgear ratings have been proved by years of application experience. In what follows outdoor conditions are co-related with these established temperature limits. Uncontrollable variables make outdoor tests unsatisfactory. The estimated effect of a 10-mph wind compensates for a 2,000 w solar energy rate, and industrial haze and clouds reduce solar radiation considerably. As the effects of wind and cloud cannot be practically measured, field test data are usually difficult to interpret.

Laboratory tests eliminate these effects, leaving solar radiation and ambient temperature as the only variables. The practicability of such a test, however, hinges upon establishing an acceptable daily pattern for solar radiation and reproduction of its effects.

Accordingly, pyrheliometer readings for June 16 to 30, 1952 were obtained from the weather stations at Pennsylvania and Ohio State Universities. The plot of the hourly highs for this 15-day period in Fig 1 establishes a sine function curve for solar radiation and a maximum value of about 100 w per sq ft. This 100-w value seems reasonable in view of the physicists, established maximum intensity of radiation of 124 w through clear air.

Total Solar Input . . . Total solar input is a combination of the effect on the roof and exposed walls. The horizontal component was assumed to be part of a trigonometric relation between the sun at 22½ deg north latitude (Tropic of Cancer) and a switchgear installation at 40 deg north latitude. Since the cable side of a metalclad unit usually presents the most serious temperature problems, this side was exposed to test radiation.

The 40-deg north latitude location was selected as typical. Actually, lines of equal solar intensity roughly parallel the latitudes only during winter months. But with warmer weather, longer days, and shifts of surface haze, these lines deviate and seem to parallel nothing at all. Thus it is incorrect to imply that all locations on a given latitude receive the same radiation intensity. But, because this is a varying condition and 100 w per sq ft is believed a relatively high rate, no effort was made to recognize further the actual intensity distribution.

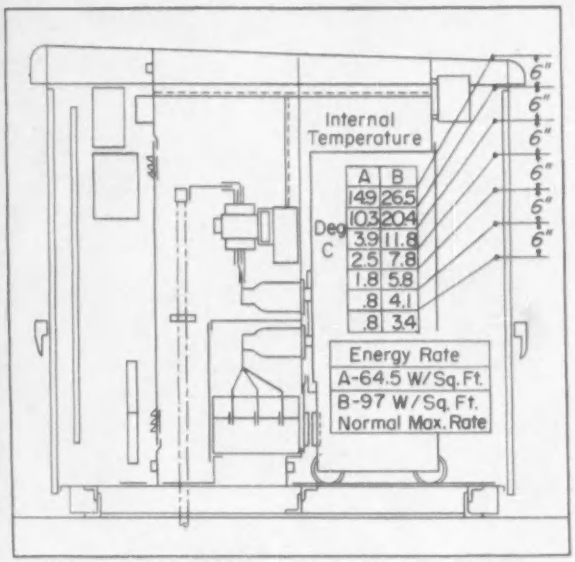


Fig 2—EFFECTIVE TEMPERATURE RISE inside a 5-kv metalclad switchgear due to solar radiation decreases with distance from roof

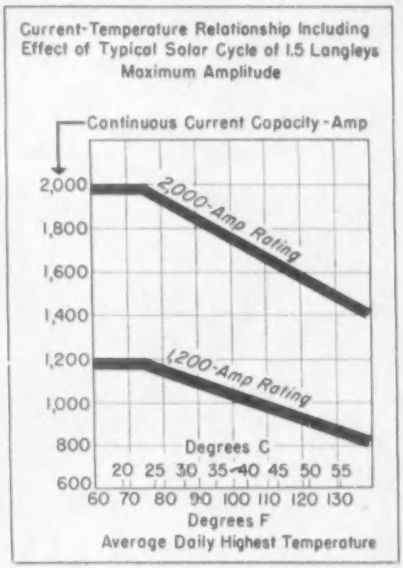


Fig 3—CAPACITY of 1,200 and 2,000-amp switchgear is function of average daily temperature high

# of Outdoor Metalclad Switchgear

Total heating combines effect on roof and exposed walls

Temperature Run . . . Banks of infrared lamps supplied the vertical and horizontal components of solar radiation to the top and door of the unit, respectively, as shown in the photograph. Radiation intensity was adjusted through voltage control on each bank in accordance with "Industrial Applications of Infrared," by James Doyle Hall, McGraw-Hill Book Co.

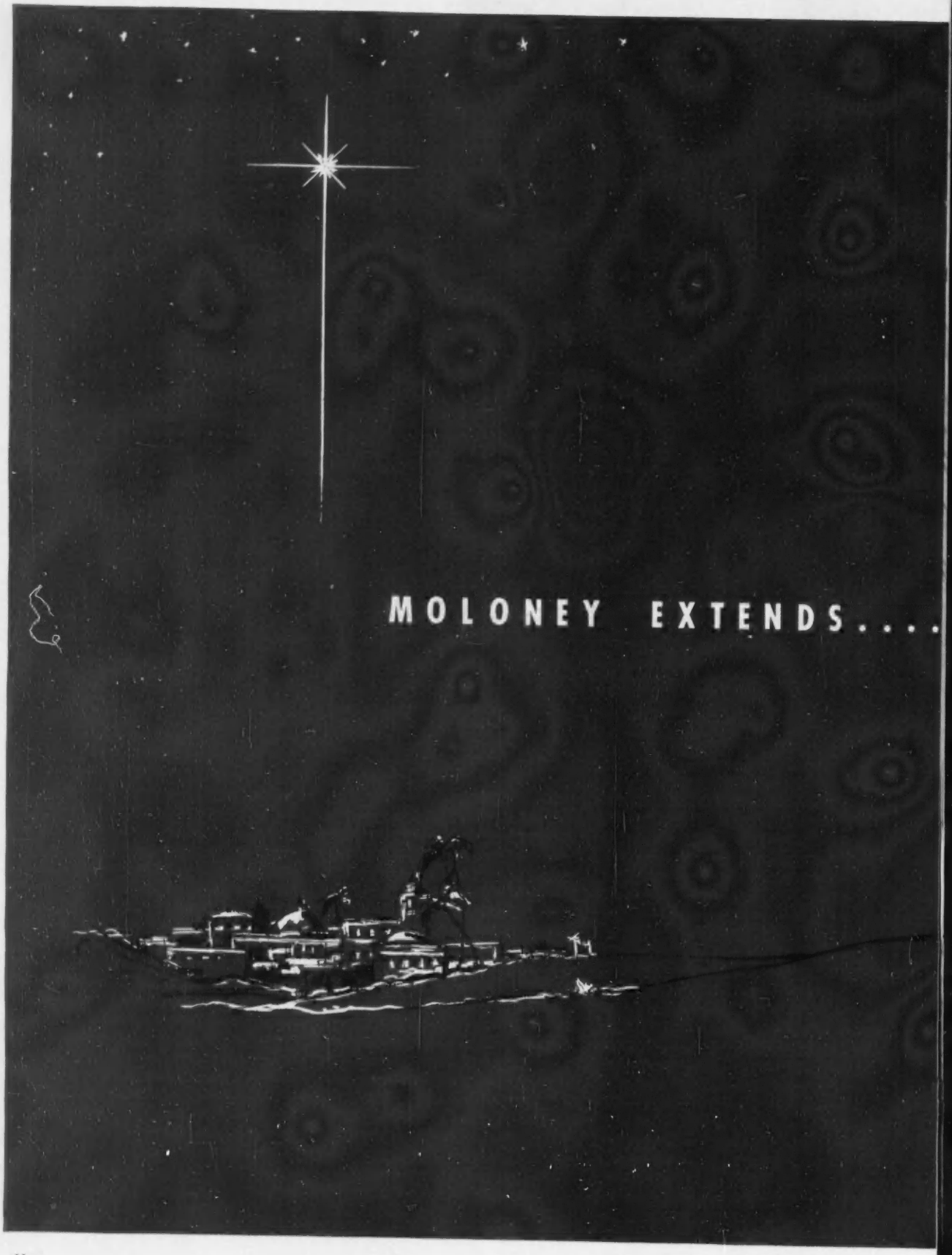
A complete temperature run required approximately 20 hr. It was necessary first to level the temperatures for a given load current. Then the solar cycle was started. The test continued until all temperature readings showed a drop, usually 12 to 14 hr later. The results of a typical run are shown in Fig 2. According to "Standard for Switchgear Assemblies and Metal-Enclosed Bus," AIEE Standard No. 27, the ambient temperature surrounding cables shall not exceed 55C, cable terminal temperatures shall not exceed 85C, and insulated bus temperatures shall not exceed 90C.

Test results show that although the ambient started to drop during the sixth hour, the copper temperature rose until the tenth hour. This phenomenon indicates the fallacy of the usual concept of rise over ambient under these circumstances. If a "rise" is to be assigned, it must be indicated whether it occurs simultaneously with ambient or internal temperature crest, or if it is the difference between the two crests several hours apart. As total temperature is the major concern and an ambient reference must be used for local applications, it was decided that the total difference in crests is the important value.

Among measures for restricting the entry of solar energy, bright metal or metallic finish for exposed surfaces was tried, probably because such materials are used on barn roofs and gasoline storage tanks. But bright metal, although highly reflective, has low emissivity characteristics. Reflecting metal, while suitable for applications permitting air or liquids to carry off the heat, has a negligible effect on the critical temperatures of switchgear because of the internal heat source.

Shields . . . Properly designed shields, permitting air circulation and shading the roof from direct radiation, were found to reduce the roof temperature appreciably. Their greatest value, however, is limited to locations near the roof. As depth of penetration affects the degree of rise, the extent of improvement from roof shields is a factor of the distance to the roof of the affected part.

Recommended loading of outdoor metal-clad switchgear may be determined from Fig 3. It permits a realistic application based on actual local daily temperatures.


MOLONEY EXTENDS....

Season's greetings

MOLONEY ELECTRIC CO. • ST. LOUIS

MOLONEY ELECTRIC

ENGINEERING MEETING

ASME Studies Corrosion Problem

Papers at annual meeting suggest methods of removing deposits from combustion. Disposal of radioactive wastes seen hampering production of electric energy from atom. Oceans too small to absorb entire amount

An approach to the problem of corrosion and deposits from combustion was presented in two papers at the annual meeting of the American Society of Mechanical Engineers in New York, Nov. 29 to Dec. 4.

H. Karlsson, Air Preheater Corp, and A. J. Tigges, Jackson & Moreland, in discussing removal of solids ahead of the air preheater said the electrostatic precipitator was best suited for this job but only if it could be cleaned continuously. They also offered data from a small experimental unit and a pilot unit at Consolidated Edison's Hell Gate Station.

H. Klemperer, Air Preheater Corp, and J. E. Sayers, James Howden Co, Ltd, Glasgow, Scotland, discussed a full scale precipitator based on these principles. It consists of 12 independent sectors arranged in rotary symmetry. It operates in a temperature range between 500 and 750F and at a gas velocity of 40 ft per sec. Cleaning is accomplished by a continuous stream of gas moving from one sector to the other. Power to the sector is suppressed during the cleaning period. Over-all efficiency when used in conjunction with a mechanical collector is about 97%. It is installed in the Barking Station of the British Electric Authority. Rating of the unit is 150,000 lb per hr.

Fly Ash Characteristics . . . Collector performance is greatly influenced by the diverse physical and chemical characteristics of fly ash encountered in practice. To prove this, H. J. White, Research Corp Laboratory, gave details of particle size, carbon content, density, concentration, cohesive and adhesive properties, electrical properties, and chemical composition. Unfortunately these characteristics are not in most cases accurately predictable.

C. R. Flodin and H. H. Haaland, both of Western Precipitation Corp, stated that current boiler design practices seem to be working against the collector because the electrical resistivity of the ash is being adversely affected.

Air Pollution Controls . . . Cleveland's cooperative meteorological and air-pollution program was described by H. J. Scott, Commissioner of Air Pollution Control in Cleveland. Results indicate that the greatest single influence on the concentration of sulfur dioxide, other than source, is wind direction, that wind velocity has no apparent effect but that inversions do have an effect on the concentrations. One hundred forecasts of mean concentration within plus or minus 0.060 ppm, proved correct approximately 95% of the time, the Cleveland commissioner declared.

Nuclear Energy . . . Papers on nuclear energy presented problems which may in the long run be the determining factors in the realization of obtaining electric energy from the atom. These problems are safety and disposal of radioactive wastes.

M. Benedict, Atomic Energy Commission, said that a 100-Mw reactor in normal operation would produce 10 billion lethal doses of radioactive material. However, he assured his audience that there are means at the disposal of the reactor designer to lessen the potential danger of this radioactive material. Among these means are the inherent negative temperature coefficient of the reactor, the use of pressurized containment vessels to house the reactor, and the choice of an isolated location.

The justification of Benedict's confidence is exemplified by the safety record of the AEC Material Testing Reactor at Idaho Falls, Idaho. At this establishment several independent automatic devices for shutting down the reactor and none for starting it have resulted in safe operation, said R. L. Doan, Phillips Petroleum Co. He indicated that the main problem of the MTR's control system is to provide means of measuring, with no gaps, the neutron-flux level over a range of 11 decades.

G. W. Hatfield, Atomic Energy of Canada, Ltd, in describing the Chalk River reactor accident said the following lessons were learned:

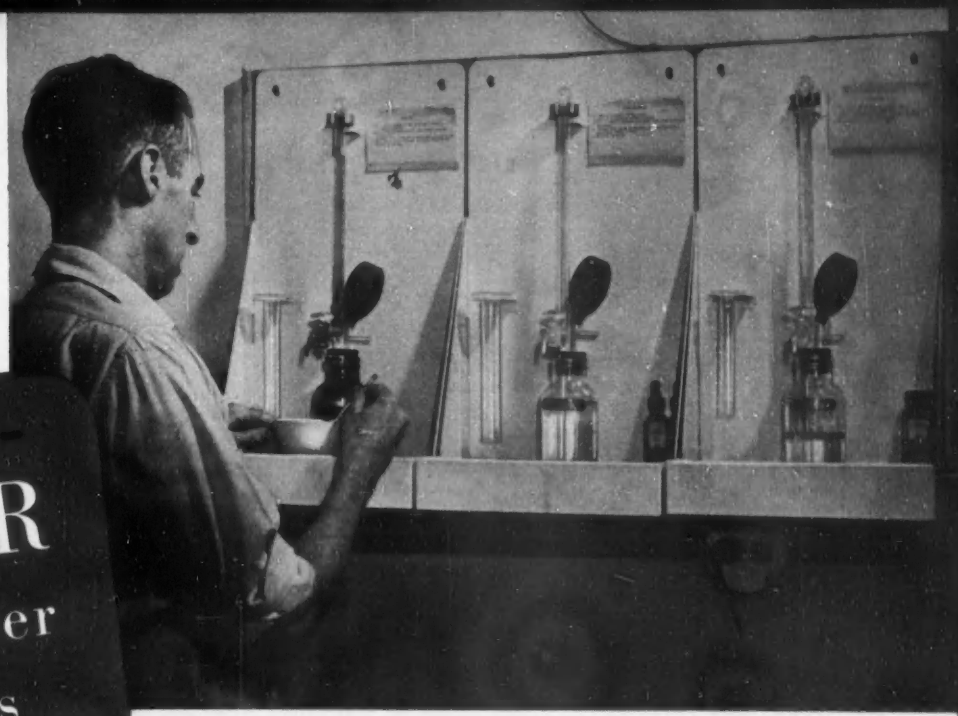
1. Ease of dismantling the unit must be incorporated in the original design.

2. Rate-of-rise amplifiers must be installed to trip the shut-off rods into the reactor should the power increase exceed a preset rate.

3. All surfaces below the reactor should be of a smooth finish and non-absorbent if water is used as a coolant.

Abel Wolman asserted that the disposal of radioactive wastes will have to be done by more economical methods if atomic energy is to compete favorably in costs with other fuels. He indicated the magnitude of the problems by stating that if the world's oceans were used for dilution, 5% of the total ocean volume would be required by the year 2000.

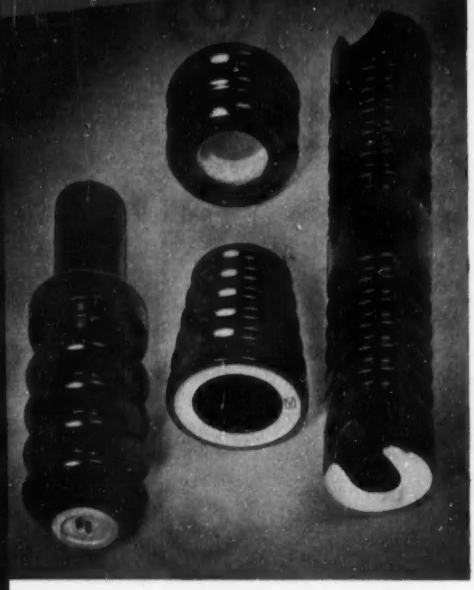
Turbines . . . Characteristics of the cross-compound steam turbine make it ideally suited for efficient application to generating units of large capability, said C. D. Wilson, Allis-Chalmers Manufacturing Co. To overcome the disadvantage of cross-compound units, namely, high investment costs, complexity in design and operation, and large floor space requirements, he offered the close-coupled design unit. This design not only decreases the investment costs and flow space requirements but also offers other operating advantages. One of the advantages is the



Continuous laboratory testing and special treatment of water make possible Victor *Purified* Porcelain

Another Reason Why—

VICTOR Makes Better Insulators



Victor manufactures many special shapes in addition to a complete line of standard porcelain for transmission and distribution.

ONLY VICTOR MAKES

PURIFIED PORCELAIN

Many milestones in insulator progress have been due to VICTOR research. But none is as important as its development of *Purified* Porcelain. By specially treating the water used in the manufacture of VICTOR Insulators and employing many other ceramic advances, VICTOR gives you the finest insulator porcelain ever made—porcelain which, for the first time in the industry, is *pure* porcelain all the way through!

Purified Porcelain has vastly greater uniformity in mechanical and electrical strength values, higher mechanical impact and puncture voltage values, greater density, hardness and permanence than any other insulator porcelain. That's why more and more power men are specifying VICTOR *Purified* Porcelain Insulators.

Specify

VICTOR PURIFIED PORCELAIN INSULATORS

VICTOR INSULATORS, INC., VICTOR, N. Y.
SUBSIDIARY OF I-T-E CIRCUIT BREAKER CO.

Low and High Voltage Pintypes • Suspensions • Guy Strains • Spools • Switch and Bus Insulators
Custom Designed Porcelain

use of a single oil feed for the bearings on both the high and low speed shaft systems.

G. W. Kessler, Babcock & Wilcox Co, felt that the major obstacles in the advance to higher steam temperatures are the restrictions necessarily placed on furnace exit gas temperature to assure cleanliness of the convection surfaces. However, Kessler said, boilers can be designed around this obstacle by using gas recirculation or radiant heat transfer. These not only provide the means for attaining high steam temperature but also facilitate wide-range steam temperature control.

E. M. Powell and H. A. Grabouski, both of Combustion Engineering, Inc, discussed the problems resulting from the increase in boiler pressure. At higher pressures the following items present problems: the small difference between water and steam density, small pressure drop in the drum, boiler drum level, and concentration of boiler water solids. As one solution to these problems they offered the steam drum equipped with turbo-separators.

In discussing stack vibration, E. J. Stankiewicz, Sargent & Lundy, indicated that while steel stacks are subjected to both cantilever and ovaling vibration, concrete and brick stacks are not usually subjected to these forces because of their high moments of inertia and excellent damping characteristics. He displayed charts that indicated initial costs of tall concrete stacks are less than steel or brick.

E. W. Hewson outlined a method that would enable stack designers to determine ground concentrations of gases from stacks when a stack height and gas velocity have been selected. Part of the method requires wind tunnel studies on a model of the stack and power plant building.

Gas Turbines . . . Fuel oil for the gas turbines on the Central Vermont Public Service system is hauled by tanker and is usually subjected to sodium (sea-water) contamination which results in rapid deposit formation as well as corrosion. Washing the oil with a water solution of magnesium sulphate largely eliminates the deposits and inhibits the corrosion otherwise resulting from the vanadium content. In their paper the General Electric authors, B. O. Buckland and D. G. Sanders, stated the centrifuge-wash process costs about 14¢ per barrel, gives an exceedingly clean oil, and good performance as to corrosion-prevention and sustained turbine efficiency.

By the end of 1954 General Electric will have 97 gas turbines in operation of which 19 are for power generation aggregating about 9 Mw. According to W. B. Moyer the 71 in operation June 1, 1954, had accumulated over 345,000 hours of service. Major maintenance items have been combustion liners (first replaced after 30,000 hours operation), first-stage nozzles, and the controls.

The first single-shaft machine (Oklahoma G&E) had been in service 31,141 hours up to June, 1954, with 91% plant availability and 1% of forced outage over 4 years. Maintenance costs were $2.05/kw/yr of max capability and 0.328 mills/kwhr. Performance has been less satisfactory on some of the ten regenerative-intercooled cycle machines because of corrosion and deposit difficulties when operating on residual-oil fuel. Correction has brought availabilities up to 92% over the last 6 months.

Surface-roughness method of determining corrosive attack of vanadium and/or sodium bearing oil was offered as quicker than deposit analysis or weight loss determinations. The Westinghouse authors (Young, Hershey, and Hussey) reported also that Inconel X is well resistant to vanadium attack and that magnesium oxide additive renders it similarly resistant to sodium. P. T. Sulzer of Sulzer Bros (Switzerland) found that sodium (mostly in sulphate form) caused large turbine deposits but is usually corrosive only in the presence of vanadium pentoxide. Application of aluminum silicates to the 20-Mw gas turbine at Weinfelden gave 2,200 hours of clean, efficient operation.

POWER BRIEFS FROM THE NEWS

● Chugach Electric Association of Anchorage, Alaska, has secured the release of $2.8 million Rural Electrification Administration loan on which a "stop order" had been placed last year. The loan will be used to add a 5,000-kw turbine to the association's steam plant, bringing generating capacity up to 14,500-kw, and also to extend distribution lines.

● Los Angeles Department of Water and Power has asked the Los Angeles City Council to authorize land acquisition for a steam plant to be constructed south of Long Beach, Calif., at a cost estimated in excess of $90 million. Construction is scheduled to begin in about five years. The plant, whose capacity is expected to exceed 512,000 kw, is planned to follow completion of a $90-million steam plant in the El Segundo area which is slated for construction in 1957-1959.

● Utah Power & Light Co plans to build a new $400,000, two-story office building in Ogden with completion set for mid-1955. The structure will accommodate general office departments now housed in the Ogden Division office headquarters.

● European Organization for Nuclear Research expects to have its 600 million-v synchro-cyclotron ready in about three years. This unit, and another 25 billion-v machine will be part of a research center now under construction between the city of Geneva, Switzerland, and the Jura Mountains.

● The Edison Electric Institute Resuscitation Medal has been awarded to Bernard E. Luce, Central Vermont Public Service Corp lineman, for saving the life of a fellow-lineman. Luce applied pole-top resuscitation after the lineman had come in contact with a 4,160-v circuit while working near the top of a 35-ft pole at Manchester Center June 10, 1952.

● Representatives of public and private power companies in the Pacific Northwest held a meeting last week at Washington State College to discuss the feasibility of establishing a cooperative AC network analyzer laboratory on the Pullman campus. Only AC analyzer now in the Pacific Northwest is in full-time use by Bonneville Power Administration.

25-year-old Manson tape exceeds ASTM specs

A railroad electrical engineer questioned us the other day in reference to the lasting quality of our Okonite and Manson Tapes. This recalled a letter we received a few years back

from a man who had bought a roll of Manson tape 25 years before. His letter said:

"There is not much left on this roll of Manson tape, but I have been pulling a little off this roll for 25 years... I have the original tin box and always keep the tape in it and the little bit that is left is still good." And he enclosed what was left of the tape.

We couldn't make all the ASTM tests because of the small amount left. But we made a tensile strength test and found that the sample tested about *25% above* the ASTM minimum. ***It also withstood the ASTM dielectric strength test of 1000 volts without breakdown.***

There are lots of case histories like this in our files. Remember, when you specify tape, you really want protection for the weakest part of the cable. Your best security is in the best tape.

Economy in tape is a long-range proposition. Okonite and Manson tapes will keep the splice tight and waterproof longer than ordinary tapes and consequently will help cut down high maintenance costs. It's "spliced for life" when you use Okonite premium quality tapes.

Why not send for a set of instruction sheets, EW-5678; you'll find them helpful.

...when you splice with:

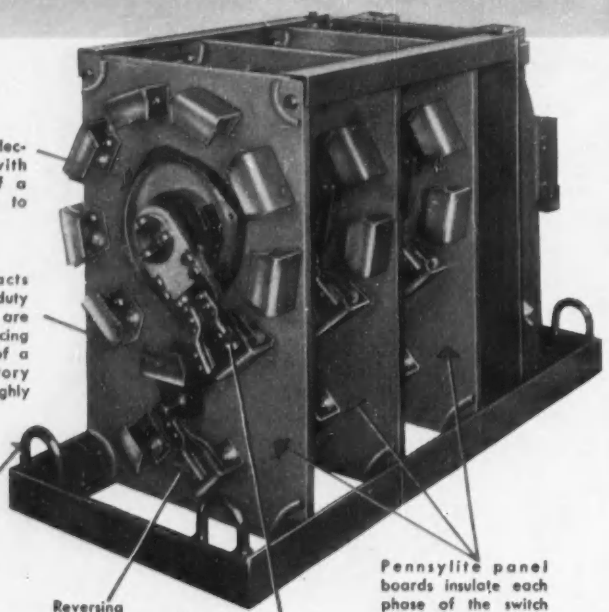
AVAILABLE THROUGH AUTHORIZED DISTRIBUTORS ONLY

3434

Made by
THE OKONITE COMPANY
PASSAIC NEW JERSEY
SINCE 1878

SPECIALISTS IN ELECTRICAL WIRES, CABLES AND SPLICING MATERIALS FOR 75 YEARS

Only in PENNSYLVANIA LOAD TAP CHANGING TRANSFORMERS do you get


Collector rings of electrical bronze with sliding brushes of a different bronze to prevent galling.
Stationary contacts made of heavy duty electrical bronze are faced at the arcing edges with tips of a sintered refractory material which is highly resistant to erosion by arcing.
Hook Eyes for lifting assembly in and out of tap changer compartment.
Reversing switch.
Heavy duty movable contacts.
Pennsylite panel boards insulate each phase of the switch from the other phases and from ground.

Silent Snap* TAP-CHANGING ACTION

Here is the Pennsylvania Load Tap Changer that combines quiet operation with a contact breaking and making mechanism that has a variable speed — fast, then slow.

THE SILENT SNAP SWITCH *Starts Fast*

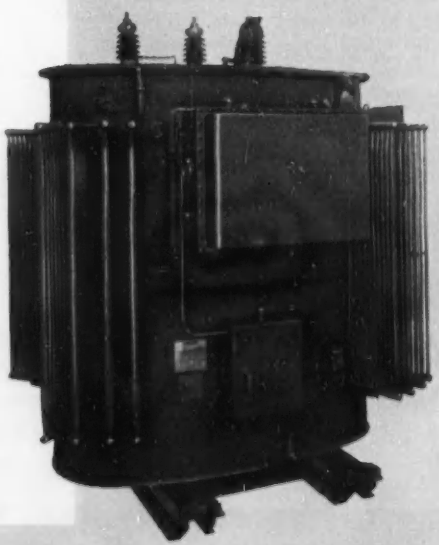
The Geneva gear, which positions the switch for every step, turns slowly and independently of the tap changing contacts. Three drive springs are released from a compressed state and actuate the movable contacts with a lightning-fast snap action. Swift contact separation reduces the arcing time to a minimum and thereby extends the life of the contacts. Operation is the same, whether the mechanism is driven electrically or manually.

THE SILENT SNAP SWITCH *Stops Gently*

Pennsylvania's exclusive hydraulic shock absorber action, which cushions and absorbs the impact energy, stops the contacts in their new position — *smoothly* and *quietly*.

THE SILENT SNAP SWITCH *is Quiet*

Quiet equipment is especially desirable for installation in residential areas where undue noise, formerly associated with load tap changing equipment, is obviously objectionable. Since the Silent Snap switch operates *quietly*, without the banging of metal against metal, mechanical fatigue and mechanical wear are reduced to a minimum.



Pennsylvania Load Tap Changing transformers with the Silent Snap switch are available in sizes up to 7500 Kva and in all voltages.

PENNSYLVANIA TRANSFORMER COMPANY
A McGraw Electric Company Division • **CANONSBURG, PA.**

For complete information, write to Pennsylvania Transformer Company, Canonsburg, Pa., and ask for Catalog 5112.

*Trade-Mark

Mica Creek Plan

B. C. Premier cool to hydro proposal, claiming province gets no tax or power returns

Proposal by group of U. S. utilities for a hydroelectric development at Mica Creek on the Columbia River in British Columbia has been given the official cold shoulder by Premier W. A. C. Bennett and his cabinet.

Five Washington state utility companies, represented by Puget Sound Utilities Council, have proposed building a $250-million, 700-ft high dam at Mica Creek to be given to the B. C. government in exchange for the release of stored water for U. S. generators on the lower Columbia. B. C. would be able to use water or generation before it crossed border but would have to spend about $50 million to build its own generators.

Premier Bennett said the "Government of B. C. is not interested in this kind of proposal."

Premier Bennett reasons this way:

Agreement would not give B. C. any return in taxes or power as in case of Kaiser Chemical & Aluminum Corp dam at Castlegar. He termed the "great value" of the Kaiser agreement is that it established a precedent of collecting taxes and downstream benefits in exchange for permission to build a storage dam.

Since the Mica dam would be built by U. S. interests and turned over to B. C. it would mean the province would get no taxes from it.

Under the Kaiser agreement, Kaiser builds dam, retains ownership for 50 years, pays about $275,000 annual taxes for that time, and turns back 20% of extra power to B. C. from U. S. generators.

AEC's Research Reactor at Argonne Declassified

Atomic Energy Commission has declassified its present research reactor at Argonne National Laboratory, located in Chicago.

That facility is used primarily in irradiation tests, and is not a power plant. However, it is also used in training reactor technicians.

In a speech made recently before the Executives Club of Chicago, AEC Chairman Lewis L. Strauss said the commission has earmarked enough fissionable materials to fuel 15 reactors similar to Argonne's CP-5 in foreign countries for a period of five years.

In discussing declassification of the Argonne reactor, Strauss said this:

"We have removed the security restrictions as to access which have surrounded it. The CP-5 reactor has been in the main declassified and pertinent information concerning its construction and operation will be available. This is another example of the efforts of the Atomic Energy Commission to make atomic energy facilities more accessible to American industry. During the past six months, while still under security requirements, many irradiation services have been carried on in the CP-5 for both universities and industry, but now we expect that much more use can be made of this modern research instrument."

WWP Asks FPC Permit for Noxon Rapids Dam

Washington Water Power Co has filed an application for permission to build an $87-million concrete and earth-fill dam at Noxon Rapids, Mont., on the Clark River.

The Noxon project, 23 miles upstream from the company's new Cabinet Gorge Dam, will almost double the river's production for WWP.

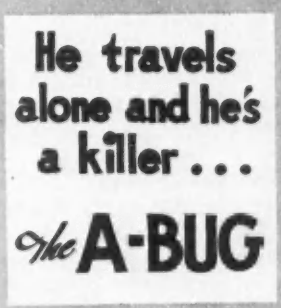
Pres Kinsey M. Robinson said WWP present plans call for a power plant with a rated capacity of 328,000 kw capable of producing 385,000 kw. The powerhouse, on the southwest bank of the river, will have a 154-ft head with vertical semi-outdoor generating units.

The company has been studying the site without opposition for the past two years.

Robinson forecast a construction start by July, if the Federal Power Commission approves the application quickly, with completion by the fall of 1959.

The plans call for an 1,120-ft spillway and powerhouse intake section of concrete, flanked by two earth-fill wings bringing the total length of the dam to 5,220 ft. The wings will be extended 900 ft on the northeast bank and approximately 3,200 ft on the southwest bank.

INDUSTRIAL RELATIONS



What is an "A-Bug?"

Turn over and see

Here he is... the A-BUG

Note: "A" is for accident

"A-Bug" Cuts Accidents

"A-Bug?", huh? The idea of the "A-Bug" was originated recently by General Manager, J. L. Sisk while discussing the Nashville Electric Service's safety program. The "A-Bug", or "Accident Bug", is a characterization of the germ that bites people and causes them to have accidents. He has been used effectively in Nashville Electric Service's accident prevention work until now the personal injury record and the automobile accident rate have dropped below the national average.

Introducing the "A-Bug" . . . The method of introducing the "A-Bug" to employees was an important factor in the success with it. Each supervisor was informed of the plan. Posters were placed on bulletin boards for five weeks before anyone met the "A-Bug". Each employee asking what was an "A-Bug" was told to see his foreman or supervisor. The foreman or supervisor told them to watch the bulletin board for more information on this "Accident Bug".

The posters were placed on bulletin boards after hours, so no one saw them placed there. Posters were painted by an artist in bright colors and are shown on preceding page. After the A-bug had been introduced to everyone, safety meetings were kept on a regular schedule; and a special effort was made to see that everyone attended a safety meeting each month.

Building Unions Ask AFL When Is Construction 'New'

Contending that some $500 million worth of new construction work is done for western utility companies by maintenance men when the work belongs to construction men, the American Federation of Labor Far Western Conference of Building Trades Councils has resolved to ask AFL headquarters in Washington to define new construction as related to utilities.

This decision was reached at the Far Western Conference's second annual convention Nov. 27-28 in San Francisco.

A spokesman for the conference said utility companies have been hiring maintenance men to do new construction work at a lower rate than construction men would demand. "Worse yet," said the spokesman, they have hired non-union laborers to fill out the work force.

Work involved in the jurisdictional dispute includes construction of new pipelines, substations, buildings, roads, and high tension lines.

Permitting maintenance men to do such work for repair purposes was the opening wedge, the spokesman said, leading to increasing use of maintenance men on new projects.

One solution to problem, building trades feel, would be memoranda of understanding with utilities guaranteeing that new work would be let to private contractors.

Maintenance workers involved in dispute are affiliated with various unions, including International Brotherhood of Electrical Workers.

NLRB: Inability Pay Ruling Must Be Backed with Facts

An employer who claims inability to pay in the face of a union's wage demand must back up his position with facts and figures. The National Labor Relations Board says a company must show its books—or the statistical equivalent—to the union if it pleads inability to pay as the reason for not granting a wage increase.

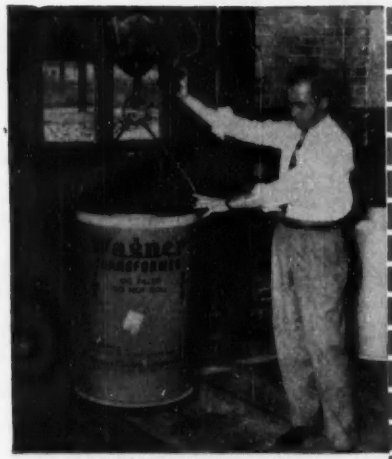
This recent NLRB decision sharpens a previous board stand that a firm must produce records to substantiate a claim that its "competitive position" would be hurt by granting the union's demands. This is the same as claiming inability to pay, the board says, and becomes refusal to bargain when not providing proof.

But there's a loophole for management. A company can simply refuse to pay an increase without stating the reason—even if its financial. There's nothing illegal about this, providing he bargains in good faith.

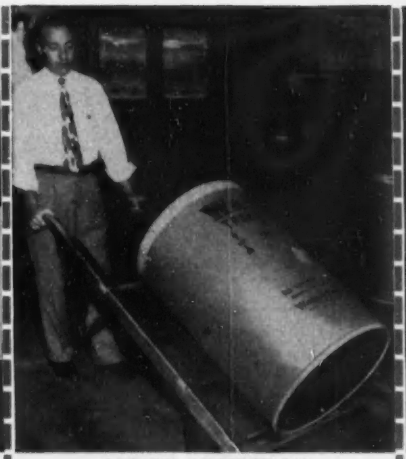
This is the board's position: "An employer's duty to bargain also includes the obligation to furnish the bargaining representative with sufficient information to enable the union to bargain intelligently and to understand and discuss the issues raised by the employer in opposition to the union's demands." What information must be furnished isn't spelled out by Taft-Hartley; it's decided by the board members—and they're all agreed that this includes financial data.

It's clear under other NLRB rulings that the union, itself, does not have to see a company's books. The employer can call in a CPA to examine the records and his statement will be enough.

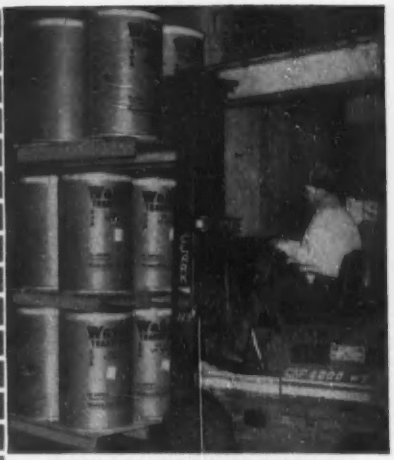
A union may demand an employer's records in order to "negotiate more intelligently," but an employer doesn't have to accede to this—unless he bases his refusal to grant an increase on an economic position.



FOR FASTER HANDLING...



GREATER PROTECTION...

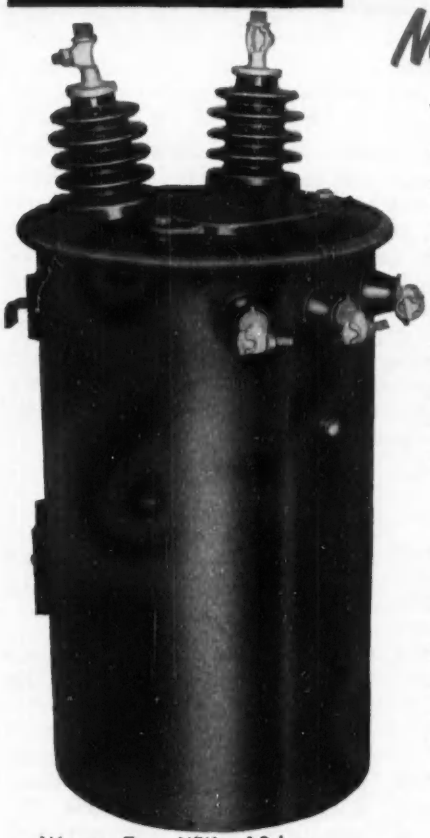


MORE ECONOMICAL STORAGE

Wagner

Small Distribution Transformers*

NOW SHIPPED to you IN DRUMS



Wagner Type HEK—10 kva Distribution Transformer

There's no need to worry about damage from dust, dirt or grease to pole type distribution transformers while they're in transit or in storage... IF you've specified *Wagner*. Wagner Types HEF and HEK Transformers are now shipped to you completely protected—securely mounted in 8-ply fibre drums.

Drum-packed transformers are easier to handle, take 25% less storage space and are less likely to be damaged during shipment than transformers packed in ordinary crates. It's a simple matter to move these drums with a hand hoist or a fork truck. Four Wagner Transformer drums fit on a standard pallet and may be stacked three high.

Wagner Distribution Transformers Offer These EXTRA Features:

Wagner's Shur-Seal Clamping Ring seals the covers on round tank transformers and prevents "breathing."

New Tank Wall Bushing ... Positive position locks for porcelain and terminal prevent loose connections on inside end of terminal studs and provide greater safety to linemen when connections are being made.

Wagner Form W Transformers are small and light in weight but are liberally designed to assure dependable performance.

Wagner Distribution Transformers are filled with inhibited oil to reduce oxidation and retard the formation of acids and sludge... you get extra years of service-free transformer life.

Write for your copy of Bulletin TU-180. It gives complete information on Wagner Distribution Transformers.

*Types HEF and HEK—3 through 10 kva.

WAGNER ELECTRIC CORPORATION

6456 Plymouth Ave. • St. Louis 14, Mo., U. S. A.

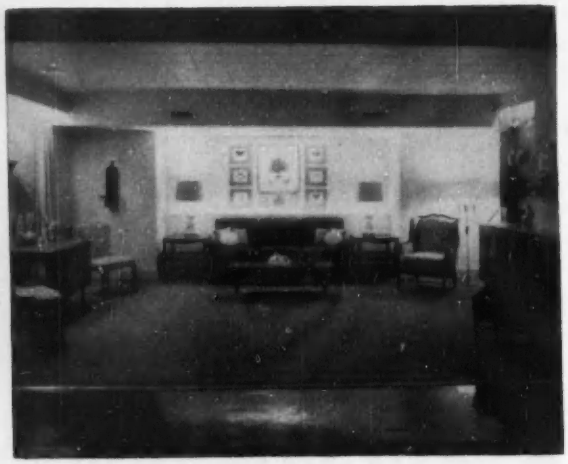
ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS – AIR AND HYDRAULIC

Wagner Electric Corporation EST. 1891

BRANCHES IN 32 PRINCIPAL CITIES

T54-17

CONFERENCE ROOM is equipped with many types of lighting fixtures to help customers to visualize and choose the exact kinds they want



NEW ROOM with latest in lighting is used to show customers the effectiveness of good lighting. Viewing area accommodates 50 persons

Cincinnati Facilities Aid Lighting Sales

Dramatic new lighting demonstration facilities are being used by Cincinnati Gas & Electric Co. One area, a combination living-dining room, has been set up to demonstrate many different types of lighting and their applications. Folding doors on one side open in front so that fifty people may be seated for a demonstration. Larger attendance is accomodated by dividing the groups between the fixture center and living room.

Beside the table and floor lamps, which provide proper intensity for seeing tasks, there are many built-in lighting features. Cornice lighting extends the full length of the dining area, and soffit lighting is recessed over the couch. Ledge lighting extends completely across the recessed area behind the couch and fluorescent tubes are used effectively in the built-in case. There are three recessed spot arrangements. One highlights the centerpiece on the dining room table, another the coffee table arrangement, and a third gives contour lighting for the lavabo mounted on the wall between the two open cases. Wiring includes multiple outlet strip around the room.

In an adjoining consultation room, lighting fixtures of many types have been installed. When a lighting advisor describes a certain type of light, the customer can visualize it in operation, and decide what he wants.

65 Farm Women Tell Why They Didn't Go Electric

"Why did you buy a non-electric range?"

Some 27% of the 65 North Carolina farm women who were asked this question by the "Carolina Farmer" magazine said they were using gas (or some other fuel) because of the operating cost of an electric range. Another 20% gave higher original cost as the principle reason, and 18% said they had gone non-electric because of the installation cost of an electric range. Other reasons given included the belief that gas is faster and more dependable.

The survey results, says Carolina Farmer, "show a weak spoke in the education job being done by the electrical industry. Far too many . . . range owner (s) had not been fully informed of the merits of the electric range," nor of the advantages to be gained by cooking electrically.

Lo, the Rich Indian

Remember the story about selling refrigerators to the Eskimos? Here's one about Indians instead. Indians from the Menominee reservation in northern Wisconsin recently received $4,881,000 in cash from the government—$1,500 each—and promptly went on a buying spree. Many bought deluxe model refrigerators. But here's the catch: their homes aren't wired for electricity. The now-pecunious redmen are using them to hold ice.

S. C. Supreme Court Upholds Service Cutoff

Can a utility cut off service to a customer when the wiring in his home is bad?

South Carolina Supreme Court last month reversed a lower court judgment for $485 against Carolina Power & Light Co for doing just that. The high court said the Florence County court should have directed a verdict for the power company instead of one in favor of a customer who had brought action against it.

Service to the customer was discontinued when the city electrical inspector found wiring in the rented dwelling to be in dangerous condition. It was resumed when the wiring was repaired three days later.

Two Jobs in One

By varying their spacing, Seattle uses the same poles to light two roadways

Approach roadways to the new Battery St. subway in Seattle posed an unusual lighting problem: how to use single utility poles to illuminate both the down-graded approaches and the adjacent normal surface roadway.

Normal spacing of the poles would have resulted in a diminishing of the surface illumination as the road grade increased the distance from lighting fixture to pavement. By varying the spacing of pole installations, the engineers were able to maintain the necessary illumination requirements on the lower road, and more than ample illumination on the upper road.

Poles farthest from the subway entrance are spaced at 102 ft with the space between poles gradually decreasing to 90, 75, 60, 50 and finally to 40 ft between poles nearest the entrance. At that point the subway roadway is 16 ft lower than the surface roadway.

Of the 14 pole installations, all except the four nearest the entrance support double fixtures to illuminate both the top roadway and the approach roadway from the same pole. Luminaires are 400-w mercury-vapor mounted at heights of 30 ft., on steel poles.

Kennecott Copper Offers Wiring Booklet, Chart

Breezy cartoons and down-to-earth talk explain problems of inadequate wiring to homeowners in a new booklet just published by Kennecott Copper Corp. Titled, "The ABC of Home Wiring," the booklet is available for promotional use, up to 50 copies free, additional quantities at $5 for each 100. Space is provided for imprinting. Request from Kennecott, Box 238, New York 46, N. Y.

Company also has published a 20 x 28-in. wall chart showing load circuit requirements for home wiring systems. It provides a ready reference source for architects, builders, electrical contractors, etc. Address requests for the chart to Kennecott, 161 E. 42nd St., New York, N. Y.

Office Sign Sells Goods

Appalachian Electric Power Co uses this theatre marquee-style sign outside its Bluefield, W. Va. office to deliver sales promotion and public relations messages. Changeable copy display is two-sided, measuring 43-in. high by 7 ft, 1 in. long. Three lines of copy are formed with 8-in. red plastic letters.

UP&L Publishes Electric Heating Booklet

"A Guide to the Use of Electricity for House Heating," published by Utah Power & Light Co, Salt Lake City, offers prospective customers information on electric space heating. The 12-page booklet contains illustrated heating data and methods for a variety of house sizes.

The heat pumps, glass panels, radiant panels, unit heaters, and reverse-cycle room air conditioners, all are covered. Booklet is distributed to customers at company offices and mailed to contractors, dealers and architects.

Electric Heating Up

That successful promotion of electric space heating isn't confined to areas with mild weather is shown by its widespread use in Montana, points out Stuart L. Forsyth, manager of Westinghouse Electric Corp's Electric Heating for Homes Department. He reports electric home heating is gaining ground everywhere, with Westinghouse sales of wall and portable units 20% ahead in first half of '54.

S & S Shorts

Wiring Finance in Rochester

A "Home Wiring Improvement Plan" is being put into action in Rochester, N. Y. by The Electrical Association of Rochester and Lincoln-Rochester Trust Co. Interest rates are the same as FHA and a completed wiring job must be approved by the Board of Fire Underwriters before the contractor is paid.

7,000 Roaster-Ovens in One Order

Nearly 7,000 roaster-ovens wrapped up in a single order have been sold by Westinghouse Electric Corp's Appliance Division to Ralston Purina Co. The roaster-ovens, having a retail value of more than ½ million dollars, will be distributed to Ralston Purina's employees, stockholders and dealers in commemoration of the company's 60th year in business.

Motel Uses 89 Heat pumps

Some 89 heat pumps, called the largest installation of packaged units in the world, have been put in service at a new Miami Beach, Fla. hotel-motel. According to General Electric Co, the units total 357 hp to heat and cool 500 rooms.

Conditioner Market Bright

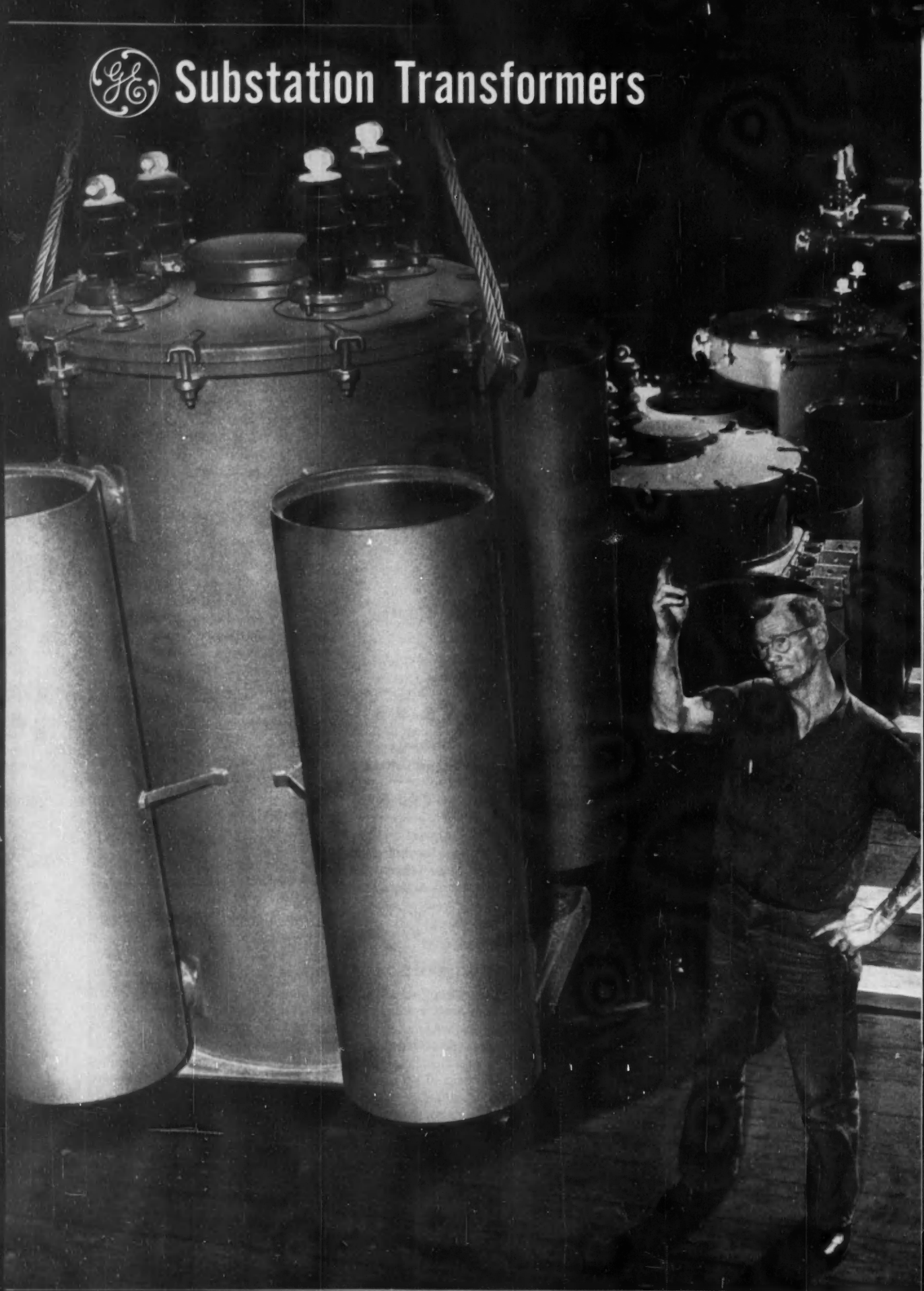
Sales of air conditioners will soar 1,000% in the next 10 years, predicts John A. Gilbreath, manager of Westinghouse Electric Corp's Air Conditioning Division.

Air conditioning, he said, is America's fastest growing industry with "almost inexhaustible markets" still barely scratched. He pointed out that 45% of the people interviewed in a survey recently made by a non-industry group said they intended to buy air conditioning soon.

Shorties . . .

General Electric Co has announced it will discontinue its policy of advertising "suggested list prices" for its larger home appliances . . . Some 88 utilities are now supporting the Beauty-Plus lamp program reports the Beauty Plus Lamp Council . . . Admiral Corporation announces its electric range sales in the first nine months of 1954 were 10% higher than during all of 1953, which was the company's previous record year.

Substation Transformers



Here comes the new look in substation transformers

G-E Chimney Radiators Cut Height 30%, Weight 10%

The new General Electric substation transformer, developed after extensive research on methods of cooling, makes possible important savings in installation and maintenance costs and, in addition, offers increased reliability.

Installation Costs Cut—For example, since height is reduced about 30%, you can install a new 250-kva unit where you now have a 100-kva unit—headroom requirements for both units are the same. This enables you to make sizeable savings because, in most cases, you can install higher rated transformers to meet load growth without enlarging your present installation facilities.

The average 10 per-cent reduction in weight and lowered center of gravity make for easier handling, further simplifying installation.

Maintenance Costs Also Cut—Repainting is easier than with conventional tanks because you paint a few large, smooth surfaces instead of many small, round tubes, complexly arranged.

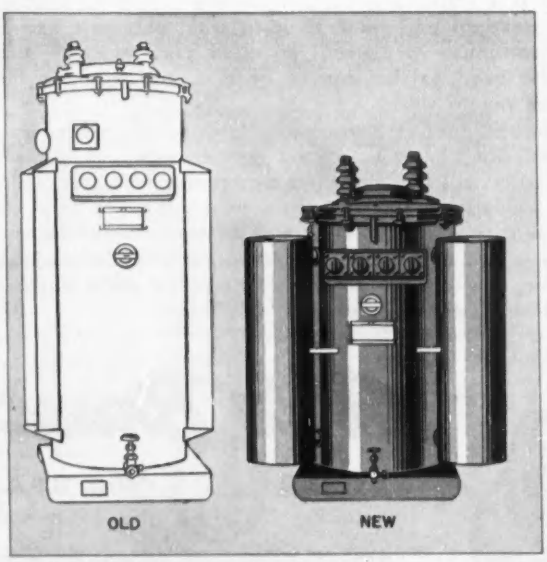
Reliability Increased—Offering the same excellent electrical characteristics as the previous design, chimney-radiator substation transformers are stronger and offer less chance for oil or Pyranol* leaks than conventional units because there are fewer openings into the transformer tank.

Availability—G-E chimney-type substation transformers are currently available in ratings of 250, 333, and 500 kva, in voltages up to 69,000 volts. For further information, write Section 431-14, General Electric Company, Schenectady 5, N. Y.

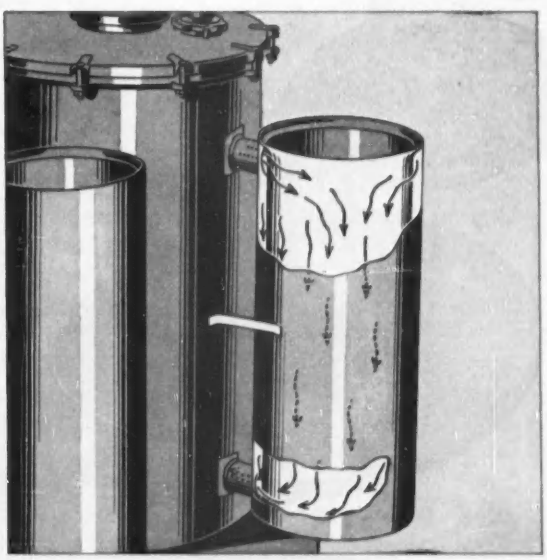
*Reg. Trademark of General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC



CUTS HEADROOM REQUIRED BY ABOUT 30%.—Where clearance is important the new G-E design is a big help because it reduces transformer height as much as 2½ feet.



MORE EFFICIENT COOLING.—The new G-E transformer has four simple, efficient cooling "chimneys." With fewer tank openings, there is little possibility of oil leaks.

you can't see the investment... NOW

Though you inspect any O-B Suspension Insulator carefully, you won't see most of the plus values - those that go beyond standards and specifications; those that turn an insulator *purchase* into an insulator *investment*.

Standardization and competition act to keep all makes of insulators uniform—at the start! How long an insulator will retain this uniformity, or how rapidly it will deteriorate from standard performance, or to what extent it exceeds (and continues to exceed) standard performance — these are the qualities that can be gauged only when an insulator is put to work.

Men who put O-B Suspensions to work thirty-three years ago still don't know how good their investments in insulation really will be. But their experience with trouble-free O-B insulation persuades them to continue to buy O-B; they've seen enough *performance* to want more of the same.

The record of O-B insulator performance is something you *can* see, and it can help turn your next insulator *purchase* into an insulator *investment*.

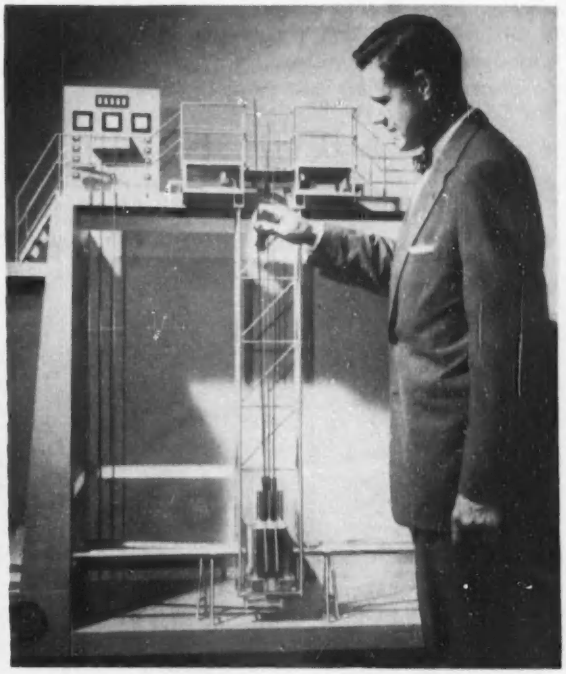
Ohio Brass

MANSFIELD OHIO, U.S.A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

6434-H

MAGNETIC STARTERS can have flexibility. Square D Co's conversion kits supply push buttons, interlocks, coils, relays and other devices



REACTOR MODEL illustrates a unitized design concept by American Machine & Foundry Co. "Unitized" components achieve flexibility

21st National Power Exhibition

With a salute to the atomic age, the 21st National Exposition of Power and Mechanical Engineering was held in Philadelphia, Pa, December 2-7. About 265 manufacturers had exhibits, occupying over 150,000 sq ft of floor area.

Nuclear power application was among the headline exhibits. Of primary interest was the Atomic Energy Commission's model of the first nuclear power station. A late development exhibited was Westinghouse Electric Corp's schematic representation of the reactor-turbine-generator system to be operated by Duquesne Light Co. American Machine & Foundry Co exhibited a model of a research reactor of unitized design; scale is one-sixth actual size.

Advances in power plant design held interest. Burns & Roe had a model showing configuration of the 1954 extension (60,000 kva) of the Jersey Central Power & Light Co's Raritan River Plant. This is the largest steam generating unit (990,000 lb per hr, 2050 psig, 1050 F) in the East utilizing cyclone furnaces.

And a model of West Penn Power Co's Mitchell station revealed that it is fitted with about 148,000 tons of copper condenser tubes.

Among manufacturers' developments of interest to electric utility engineers are the following items.

● Monel tubing is now available in lengths up to 85 ft for high-pressure feedwater applications. International Nickel Co, New York.

● A dust collector, the Paraclone, has small multiple cones with tangential intakes to set up centrifugal forces for dust separation. Aerodyne Development Corp, Cleveland.

● Electrostatic precipitator has magnetic impulse rapper at end of electrodes for dust removal from collecting plates. Research-Cottrell Inc, Bound Brook, N. J.

● A self-cleaning condenser incorporates a sluice gate arrangement, which reverses the direction of flow, thereby flushing the debris from the inlet water box tube sheets and tube ends. C. H. Wheeler Mfg Co, Philadelphia, Pa.

● Electrical fuel oil heater has a heating element encased in a finned tube. The latter, up to 20 ft long, is inserted in a pipe through which the liquid flows. Brown Fintube Co, Elyria, Ohio.

● Cable way of die-formed No. 14 guage steel is available in 10 and 14-ft lengths, up to 14 ft wide spans, and various types of fixtures. The Globe Co, Chicago, Ill.

● Industrial television system, type ITV-6, is applicable for furnace observation. It consists of a camera, cable, and monitor with 10-in. picture tube, for 500 ft transmission. Radio Corp of America.

● Latest electronic phone is most effective in areas with noise levels of 95 db and over, GAI-Tronics Corp, Reading, Pa.

(*Continued on page* 60)

Power Exhibits

(*Continued from page 59*)

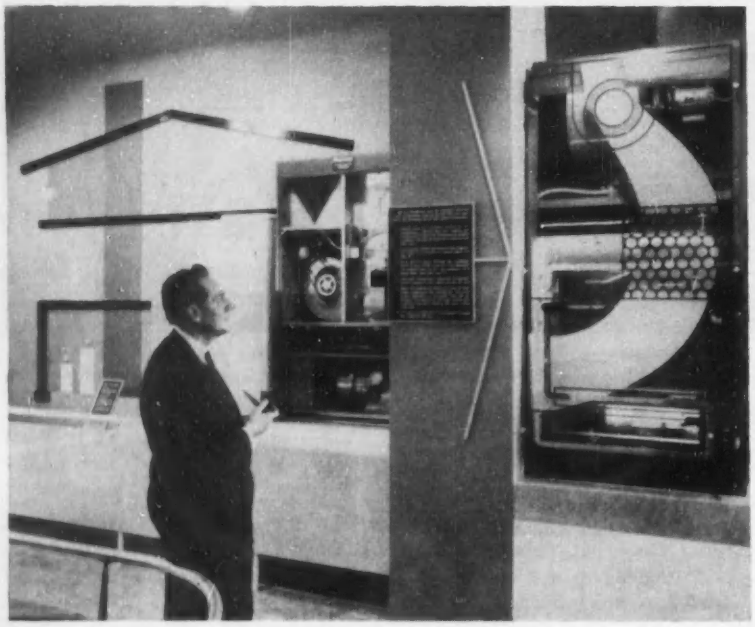
● An intake water screen and gate coating system for corrosion control will be engineered and coating thickness recommended for each individual installation. The Dampney Co, Boston, Mass.

● Contactors in NEMA sizes and three basic models have flexibility of adaption by addition of auxiliary devices. Ward Leonard Electric Co, Mount Vernon, N. Y.

● Motor starters, rated 50,000 kva IC, 2,200 to 5,000 v, are available with air-break or oil-immersed contactors, and knife-blade switches or current limiting power fuses. Electric Controller & Mfg Co, Cleveland, Ohio.

● Vented sleeve bearing for motors 200 to about 5,000 hp has annular groove to prevent oil being drawn into motor enclosure due to motor breathing. Allis-Chalmers Mfg Co, Milwaukee, Wis.

● Electronic control system regulates a power plant's output and frequency in accordance with electrical demand changes. Minneapolis-Honeywell Regulator Co, Philadelphia, Pa.



Worthington Opens Educational Exhibit

An educational exhibit of basic industrial machinery was opened by Worthington Corp this month at 99 Park Ave, New York. The exhibit illustrates basic operating principles of machinery related to business, industrial, community and home life. It is reportedly the first permanent type exhibit sponsored by an industrial manufacturer.

Practically all the displays are of the visitor-participation type where by operating the models himself, the visitor gains an understanding of the various machines and how they can be used. Two displays are shown above.

The exhibit features are:

1. Basic Principles and Applications. Illustrations are: Making steam power, generating electricity, internal combustion engine operation, mechanical power transmission, pumping, gas compression, and refrigeration.

2. Home Comfort Display. Among the products represented are: Year-round residential conditioner, a room air conditioner, and 7½-ton and 3-ton commercial packaged air conditioning units.

3. Construction Equipment. A stereophoto presentation demonstrates air compressors, contractors' tools, and concrete machinery.

4. "Worthington City". Illuminated color photographs above each related activity in the composite model illustrate power generating plants, industrial plants, air conditioned office buildings, construction crews, marine operations, water and sewage works, railroads, and homes—all served by Worthington.

GE, Utilities to Discuss Forecast to 1964

Almost 100 electric utility companies will participate in meetings with the General Electric Co on the theme "The Electrical Industry of 1964," William V. O'Brien, vice-president and general manager of GE's Apparatus Sales Division has announced.

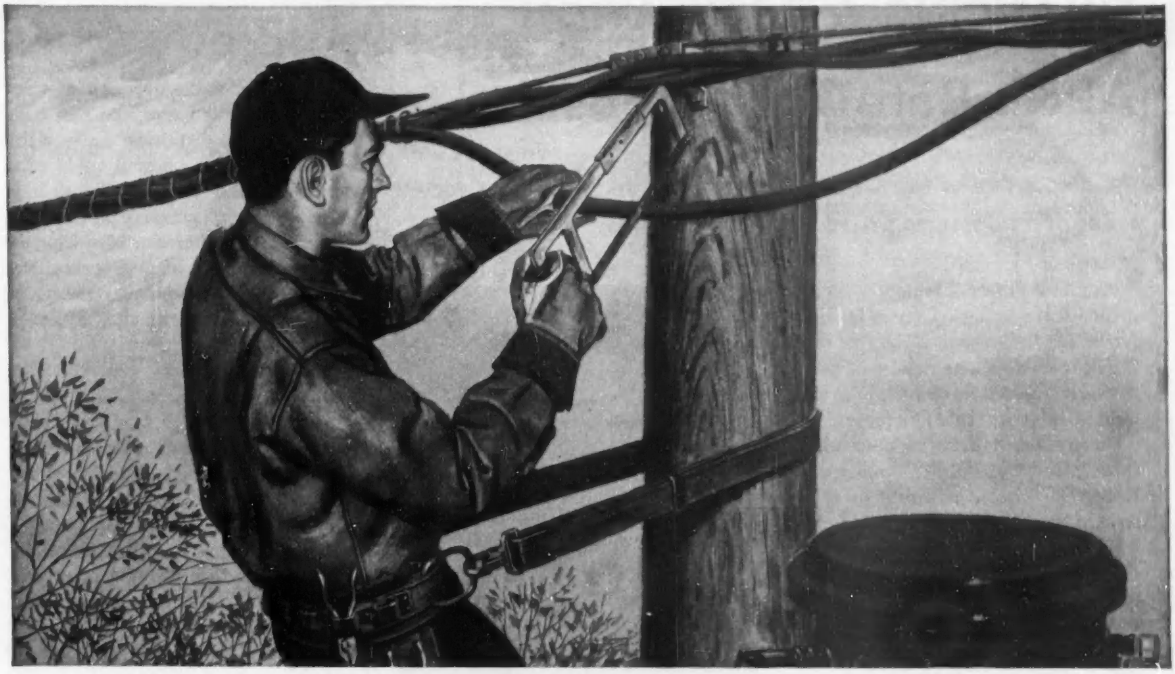
Half-day programs now being conducted by executives of GE's district sales offices offer management and supervisory personnel of utilities and consulting firms the company's forecast of requirements for all segments of the industry in the next decade.

Nearly 7,000 administrative, engineering and operating personnel will attend the meetings, with groups ranging from 30 to 400. Load growth, sales, generation, transmission, distribution and manpower development are among the fourteen subjects covered. GE is considering making the material available to participating companies for use in employee and public information programs.

MANUFACTURING BRIEFS

I-T-E Circuit Breaker Co announces the completion of additional designs and tests which complete the full line of metal-clad switchgear through 13.8 kv, 500 Mva, 2,000 amp.

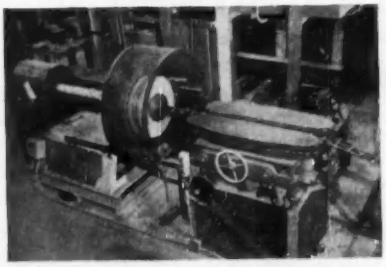
Westinghouse Electric Corp has received an order for more than $1 million worth of equipment to be installed on 50 new commuter cars for the Long Island Railroad. Equipment includes four 100-hp traction motors on each motorized car, unit switch controls, motor-generator sets, control panels and circuit breakers.



Connections are easier to make

WITH G-E REVERSE-LAY PREASSEMBLED AERIAL CABLE

General Electric reverse-lay preassembled aerial cable installed on the lines of Con Edison near Hartsdale, Westchester County.



Reverse-lay machine in operation at General Electric wire and cable plant in Bridgeport, Connecticut.

Each conductor of a General Electric reverse-lay preassembled aerial cable has sufficient slack, when unwound between reversal points, to make the necessary connections for transformers, cut-outs, or laterals. These reversal points are spaced five feet apart, so that one will always be within easy reach of a lineman on a pole.

G-E Super Coronol* aerial cable has the extra capacity needed for growing loads. The copper temperature rating up to 8000 volts is 85 C, with an emergency rating up to 115 C depending on the voltage. Voltage regulation is improved because reactances are balanced and are lower than with an open wire line. As a result, greater load-carrying capacity is obtained with preassembled aerial cable on circuits where voltage drop is a limitation.

A preassembled aerial cable installation is stronger than an open wire installation because of the strength of the messenger. Preassembled aerial cable also gives you the advantages of minimum tree trimming and neater appearance because cross arms and insulators are eliminated.

For more information on G-E reverse-lay preassembled aerial cable for use on primary and secondary feeders, see your Wire and Cable specialist or write Section W135-1227, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

** Registered Trade-mark General Electric Company*

Progress Is Our Most Important Product

GENERAL ELECTRIC

AP&L Rate Case Appealed

Company asks the Circuit Court for a decision on a recent order of PSC denying a $3.9-million rate hike

Arkansas Power & Light Co has been denied a rehearing on an order dated Nov. 22, 1954, issued by the state Public Service Commission in which it had refused the company a $3.9-million a year rate increase. The company has taken the case to the Circuit Court of Pulaski County, Ark. Robert E. Ritchie is president of the Arkansas P&L.

ROBERT E. RITCHIE

The PSC order stated in part: "On June 24, 1944, the Department of Public Utilities after extensive investigations, pursuant to its own motion, entered its order: (1) Establishing a rate base for the Arkansas Power & Light Co; (2) determining the amount of annual return to which it was entitled; (3) providing for a Uniform System of Accounts and for the adjustment of certain of those accounts; (4) determining the amount of the annual depreciation and maintenance to be allowed; and (5) finally providing for disposition of any amount of revenues in excess of the amount of return fixed by the order. From time to time the order has been amended to meet conditions and circumstances not contemplated at the time the order was first made."

Reasonable Earnings

The determination of reasonable earnings, the order said, cannot be based on conditions prevailing in 1944 when the commission first established the rate base formula since it ". . . did not contemplate conditions and circumstances now apparent which require adjustment of such process; nor upon the fairness of a rate of return calculated under conditions and circumstances in the year 1944."

The order went on to say: "In determining the electric rate base as provided for in the 1944 order, the percentage relationship between electric property and total property must be determined in order to arrive at the electric rate base, which is the portion of capital, liabilities and surplus that is invested in electric property according to the procedure specified in the 1944 order.

"All of Account 100.3, Construction Work in Progress, is included in electric property; and over the past ten years the company's plant under construction has included substantial amounts which represented plant which, upon completion, brought in additional income or reduced expenses of operation. It is improper to use this plant under construction in the determination of the rate base unless some provision is made for the inclusion of additional revenues, or the exclusion of expenses saved, particularly where it appears that interest is capitalized by the company during the construction period which, as of the period ending March 31, 1954, amounted to $1,097,655.

"The better procedure is to remove from electric property that portion of plant under construction which, when completed, will be revenue-producing, or will effect substantial savings in operation cost; . . . The portions of the amounts in plant under construction which represent plant which will be revenue-producing when completed, $22,096,692 at April 1, 1953, and $29,269,798 at March 31, 1954, should be included in the classification of Other Property. To include this plant under construction in electric plant in calculating the rate base would result in distortion because the company would be permitted to earn a return on that property before it is useful in providing utility service and before the full influence of the property on revenues and expenses has been felt. By this process the electric rate base as of April 1, 1954, is $151,101,618.

Rate of Return

"While the commission's order of June 24, 1944, specified a rate of return of 6%, Arkansas statutes and court decisions do not require that the rate of return be 6%. The only requirement is that the rate of return be reasonable. In Appendix I attached, a rate of return of 6% has been applied to the rate of $151,-101,618, and the resulting figure $9,066,097, is the annual allowable return. To this figure are added $96,-258, which represents interest on customers deposits, and $415,070, which represents amortization of electric plant acquisition adjustments. Both of these figures are taken from company Exhibit 'F.' The total, $9,577,425, is the base allowable return," the PSC order said.

Allowable Return

"On the basis of the company's operating revenues and operating expenses for the year ended March 31, 1954, the amount available for allowable return has been determined to be $9,358,255 according to company Exhibit "G." To this, the amount of $196,482 should be added because of over-accrual of federal income taxes during the year ended March 31, 1954. The total of these two amounts is $9,554,737, which is the total available return. The total available return, $9,554,737, after taking into consideration the allowances for interest on customers deposits and the amortization of electric plant acquisition adjustment, represents a rate of return of 5.985% on the rate base as determined in Appendix I. The difference between this and the 6% allowable under the 1944 order expressed in dollars amounts to $22,688, which is negligible," the order stated.

Employee Stock Plans Denied

SEC says it will not adopt a formal set of standards for registered holding companies to sell securities to its workers

The Securities and Exchange Commission, after more than a year of indecision, has announced it would not adopt a formal set of standards for employee stock option plans of registered utility holding companies.

Though there was no official word explaining the decision, observers believe it rests on doubts that SEC, under the Public Utility Holding Company Act of 1935, can permit a declaration to become effective if it might result in the issue of stock to officers and employees at a future date and at less than the prevailing market price.

SEC's action does not necessarily preclude approval of a holding company's stock option plan in the future. Conceivably, SEC could resolve the thorny legal questions on an individual basis, even though the same problems prevented adoption of a rule which would have facilitated use of such plans on an industry basis. But no such plans have as yet been approved. And the implication, at least, is that utility company stock incentive plans won't get SEC's approval.

Stock Plans Submitted

Several holding companies informally submitted stock purchase plans a year ago, which conformed to a letter sent out in May, 1953, by SEC's Division of Corporate Regulation. This letter, authorized by the old SEC, started the wheels turning. It hinted the commission was ready to consider favorably incentive compensation plans involving the issue of equity securities by a holding company, provided they met the requirements set up in the letter.

Last February, SEC indicated it was having difficulty with the matter. At that time, while announcing a hearing to consider a formal rule (U-51) to cover stock option plans, SEC said it had serious doubts about the legality of such plans under the 1935 act, and whether the 1953 letter set up standards adequate to protect the public interests of investors and consumers. The 1953 letter has now been formally withdrawn.

SEC's authority in the matter is, of course, over the issuance of stock—not the plans. And since a stock option plan would involve the issuance of stock by the holding company, the requirements of the 1935 utility holding company act must be met. In this connection, utility experts point out two sections of the law that probably figured in SEC's decision not to adopt the proposed rule.

Holding Company Control

One of these, set out in the act as a reason why federal control of holding companies was deemed necessary by Congress, states that the interests of the public, investors, and consumers are damaged when "there is lack of economy of management and operation of public utility companies . . . or lack of effective public regulation, or lack of economies in the raising of capital."

The other section involved is Section 7, covering declarations by holding and subsidiary companies regarding security transactions. Section 7 (D) of the act sets up these grounds, among others, on which SEC can refuse approval of an issue or sale of securities:

- If the security is not reasonably related to the security structure of the companies in the holding company system;
- If the security is not reasonably adapted to the earning power of the company;
- If the issue or sale of the particular security is not necessary or appropriate to the economical and efficient operation of the company's business;
- If the terms and conditions of the issue or sale are detrimental to the public interest or the interests of investors or consumers.

Regulate REA's, Utility Says

Public Service Co of Colorado has suggested that if rural co-ops plan to serve entire new communities of housing developments they should be regulated as public utilities by the state Public Utilities Commission.

PSC made its proposal after the Union Rural Electric Assn of Brighton, Colo., filed a court action in an effort to block PSC from serving Western Hills, a 6,000-home development on Denver's northern outskirts.

PSC has declined to discuss publicly the reply it will make in court to the charges raised by the Rural Electrification Administration co-op and John Kalcevic, its manager.

A statement by Robert T. Person, director of public relations for PSC, said:

"Public Service Co is planning on serving Western Hills subdivision the same as other developments in the Denver area. It is presently supplying service to areas north, south, east and west of the city, which the company has contended it was obligated to serve as a public utility.

"The REA supplies electric service to its members only and contends it is not a public utility. If it holds itself open to serve communities of this type before it is known who the customers ultimately will be, it therefore must become a public utility and consequently subject to the jurisdiction of the Public Utilities Commission."

The Colorado Assn of REA Co-operatives was among organizations that opposed a constitutional amendment approved by Colorado voters Nov. 2 to give the Colorado Public Utilities Commission jurisdiction over all utilities in the state. The REA group's opposition was based partly on the fear REA's might be subject to the PUC authority over utilities in home-rule cities—previously exempt—but the amendment specifically excludes municipally owned utilities.

Kalcevic charges the PSC has violated a mutual trade territory agreement by "invading" REA territory by extending lines to service Western Hills, expected to produce about $360,000 a year electric business.

Kalcevic claims the developers of Western Hills, headed by Barr Lumber Co, asked the REA to provide electric service.

FINANCIAL BRIEFS

Public Service Co of New Mexico has sold the second half ($1.5 million) of an authorized $3 million first mortgage bonds due 1984 to five institutions.

Pacific Gas & Electric Co has received Federal Power Commission approval to merge with its wholly-owned subsidiary, Vallejo Electric Light & Power Co.

Virginia Electric & Power Co stockholders subscribed to 582,427 of 600,000 shares common stock offered on a 1-for-10 basis at $29 a share. Under oversubscription privileges, they asked for 222,317 shares, necessitating an allotment.

Minnesota's five major electric companies are planning to invest $358.8 million in new facilities during the next five years, it has been announced.

Columbus & Southern Ohio Electric Co is planning to purchase the municipal light plant and the distribution system of Wellston, Ohio.

Commonwealth Edison Co is studying a plan to make a single distribution of remaining Northern Illinois Gas Co common stock to Edison's stockholders. It will be on the basis of aproximately one share of gas company common stock for every three shares of Commonwealth Edison common stock.

San Diego Gas & Electric Co is planning to spend $18.7 million in 1955 for construction.

Exchange of Stock Planned

California Oregon Power Co has received permission from the California Public Utilities Commission to make a stock exchange offer designed to retire two blocks of preferred stock issued at a time when cost of money was higher than at present. Copco will issue 121,865 shares of common, offering them on a 5-for-1 basis to holders of 7% preferred. Another 34,289 will be issued for exchange on a 4.4 for 1 basis to holders of 6% preferred. The offer will be open to Feb. 15, 1955.

Today in Utility Finance

YIELDS (%)

Quality	Bonds			Preferred Stocks			Common Stocks		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
DATE									
Dec. 9	**2.88**	**2.90**	**3.10**	**3.88**	**4.04**	**4.37**	**4.37**	**4.76**	**5.23**
Dec. 2	2.88	2.91	3.10	3.86	4.03	4.37	4.41	4.80	5.25
END OF QTR.									
3rd 1954	2.88	2.90	3.10	3.89	3.99	4.38	4.50	4.80	5.19
2nd 1954	2.90	2.96	3.19	4.03	4.14	4.48	4.72	5.04	5.45
1st 1954	2.82	2.87	3.14	3.88	4.09	4.42	4.83	5.19	5.42
4th 1953	3.07	3.12	3.34	4.17	4.32	4.62	5.07	5.57	5.51

Data: Reis & Chandler, Inc.

EARNINGS

Company	Period Months	Ended	Net Income 1954	Net Income 1953	Earnings Per Common Share 1954	Earnings Per Common Share 1953
Arizona Public Service	12	Oct.	$4,619,000	$3,740,000	$1.40(a)	$1.08(a)
California-Pacific Utilities	12	Oct.	621,574	573,805	2.11(b)	2.06(b)
El Paso Electric	12	Oct.	2,144,800	1,671,987	2.43(c)	2.10(c)
Iowa Southern Utilities	12	Oct.	1,145,196	1,396,130	1.37(f)	1.99(f)
Middle South Utilities consolidated	12	Oct.	16,221,610	14,497,894	2.13(g)	2.03(g)
Oklahoma Gas & Electric	12	Oct.	6,785,097	6,078,366	2.14	1.95
Portland General Electric	12	Sept.	4,146,632	3,700,759	1.38	1.23
Tampa Electric	12	Oct.	2,851,128	2,640,969	3.97	3.68

Notes—(a) Based on average shares outstanding for the period; (b) Based on 233,680 shares in 1954 and 228,685 shares in 1953; (c) Based on 840,387 shares in 1954 and 763,988 shares in 1953; (f) Based on 745,431 shares in 1954 and 630,125 shares in 1953; (g) Based on 7,125,000 shares in 1954 and 7,600,000 shares in 1953.

FINANCING

Company and Description	Amount of Offering (000)	Offering Price	Yield to Public
WEEK OF DECEMBER 9-15			
Bonds			
New Orleans Public Service—1st mtg 3¼% due 1984	$6,000	102.718%	3.11%
Puerto Rico Water Resources Authority—electric revenues due 1957-90	12,500	various	1.50-3.375
SCHEDULE FOR DECEMBER—JANUARY—FEBRUARY			
Bonds and Debentures			**Bid Date**
New York State Power Authority—revenues	$335,000	.....	Dec. 21(a)
Duke Power—1st mtg due 1975	40,000	.....	Jan. 10
Commonwealth Edison—conv. debs	50,000*	.....	Jan. 11
New England Power—1st mtg due 1985	25,000	.....	Jan. 18
Consumers Power—1st mtg due 1990	30,000	.....	Jan. 25
Los Angeles, Calif., Department of Water & Power—electric plant revenues	18,000	.....	Jan. 26
Dallas Power & Light—debs due 1980	7,000	.....	Feb. 14
Kansas City Power & Light—1st mtg due 1985	16,000	.....	Feb. 15
Texas Electric Service—1st mtg due 1985	17,000	.....	Feb. 23
Western Light & Telephone—1st mtg due 1985	3,000	.....	.....
Preferred Stock			
Patchogue Electric Light—750 sh $1,000 par	$750	.....	.....
Public Service Electric & Gas—250,000 sh $100 par cum	25,000	.....	Jan. 11
Duquesne Light—160,000 sh $50 par	8,000	.....	Jan. 20
Common Stock			
Duke Power—218,737 sh (to be offered commonholders on 1-for-20 basis, record Jan. 12 to expire Jan. 28; no underwriting)	$8,749	$40.000	5.00%
Western Light & Telephone—about 40,000 sh (to be offered commonholders on a 1-for-10 basis)	.....	.....	.....
Duquesne Light—450,000 sh	.....	.....	Jan. 17
ISSUES RECENTLY POSTPONED			
Bonds			
Gulf States Utilities—1st mtg due 1984	$24,000	.....	.....
Consolidated Edison Co of N. Y.—1st mtg due 1984	50,000	.....	.....
Preferred Stock			
Gulf States Utilities—160,000 sh $100 par cum	16,000	.....	.....
UNSCHEDULED AND/OR UNDER CONSIDERATION			
Bonds and Debentures			
Kentucky Utilities—1st mtg	$15,000	.....	.....
Southern Nevada Power—1st mtg	5,400	.....	.....
Southern Nevada Power—debs	1,000	.....	.....
Preferred Stock			
Public Service Co of Oklahoma—100,000 sh $100 par	$10,000	.....	.....
Southwestern Gas & Electric—60,000 sh $100 par	6,000	.....	June 1
Common Stock			
Kentucky Utilities—about 288,678 sh (to be offered commonholders on about 1-for-10 basis)	.....	.....	.....

Note—*Estimated; (a) Dillon, Read & Co—Halsey, Stuart & Co group, underwriters.

THIS IS A ONE-PIECE PORCELAIN

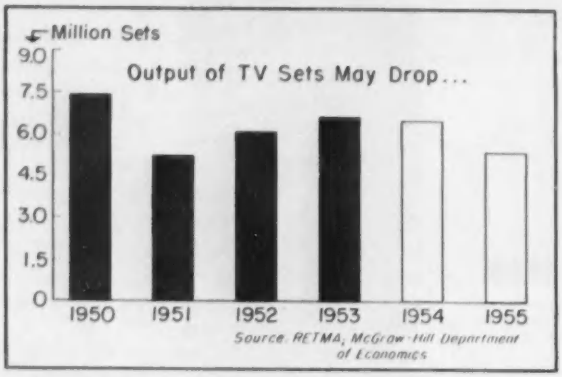
This is the interrupter unit for a porcelain-clad 230 Kv oil-blast breaker. It is, we believe, one of the largest pieces of top-quality electrical porcelain ever produced. Strictly a homogenous one-piece porcelain, it has no glazed joints or other interruption of the continuous porcelain body. It is 112″ long, has 246″ leakage distance and weighs 1325 pounds. It will be supplied with large heat-treated cast aluminum flanges, and with ends ground for gasketing.

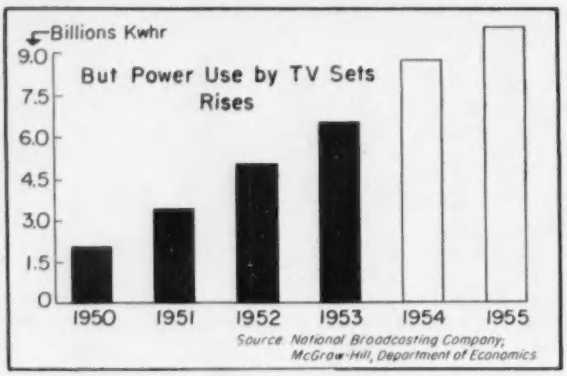
Visitors to the Lapp plant find the production rows of these units an impressive sight. We're proud of them, too—mostly because they dramatize and emphasize our often-repeated claim. Lapp experience . . . Lapp techniques of production and control . . . Lapp enthusiasm for the manufacture of sound porcelain . . . add operating security and long life to the systems on which Lapp insulators are installed.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

ELECTRICAL BUSINESS OUTLOOK





TV Sets Will Use Estimated 9.9 Billion kwhr

Television is entering a new phase—a fact that is likely to become increasingly evident over the next year. And it's a phase that should be of interest to utilities, now that TV has become an important user of electric power.

Television sets now make a significant contribution to residential power sales. Prior to 1950, power consumption by TV sets was a minute fraction of home power use. But today it has reached fairly imposing proportions.

In 1955, TV sets will use an estimated 9.9 billion kwhr of electricity—more than 8% of total residential use expected next year. Add that to the several billion kilowatthours used for broadcasting and transmission, and television's contribution to the electric utilities has become quite a tidy package.

Change in TV Picture . . . But the TV picture is changing—in two important ways. One has to do with the addition of new stations. A good part of the recent increase in television coverage has come from adding new stations. The number on the air has more than tripled since the Federal Communication Commission allowed new construction to resume a couple of years ago.

New stations have brought television to previously unserved parts of the country, thus boosting sales of sets. And they have provided additional coverage for areas that already had one or two stations. By making set ownership more attractive, this also helped set sales.

But construction of new stations won't be such a big factor from now on. They are still being built; several are added each month. But, from now on, the rate will drop off. Even the most optimistic observers don't expect the number of stations to more than double—if that—in the next six years.

The other new factor is color. Potentially, color TV is a boom both for the television industry and for the electric utilities. It's good for television because it will make TV viewing more attractive—which means bigger audiences (and, unfortunately, much higher broadcasting costs). And it will make existing TV receivers at least semi-obsolete, which means more sets sold for replacements. For utilities, it means more power sales, because color sets will use 1.5 to 2 times as much power as black and white.

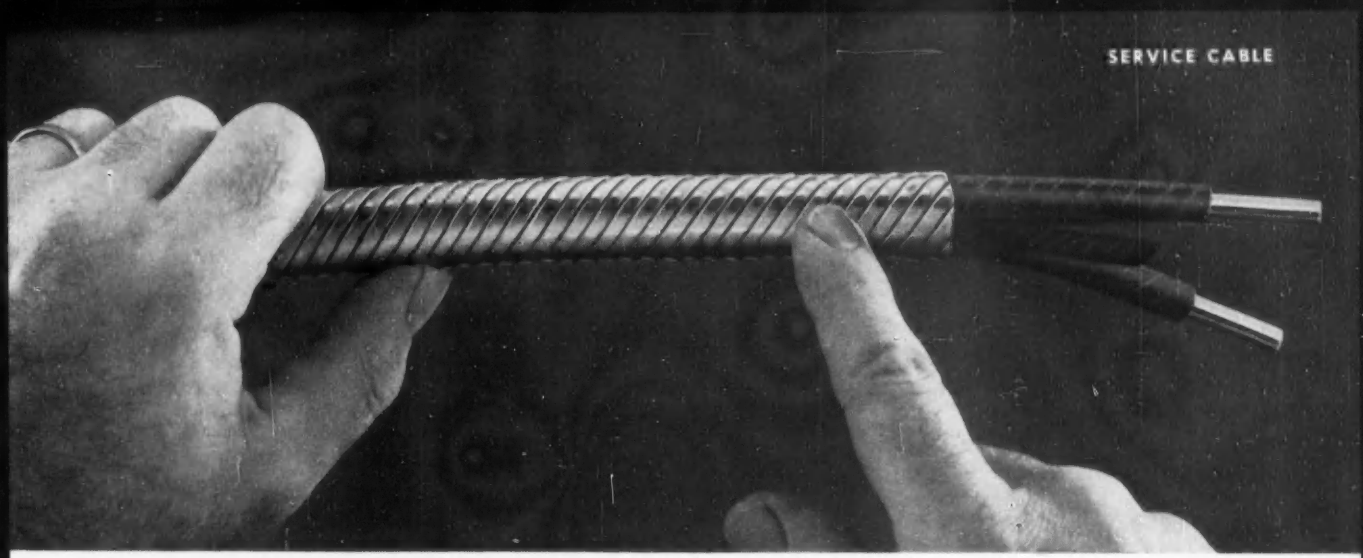
But, while color may be fine once it arrives on a broad scale, it's nothing but a trouble maker in the meantime. Producers of TV sets have been worrying for years that people would stop buying black and white as soon as color sets were made commercially, even at the very high prices—and wait until the price came down. That could knock the bottom out of set sales for a while.

Color TV Around the Corner . . . So far, this has not happened. But it's a good bet to happen next year, because color at a reasonable price is now, obviously, just around the corner. Add the fact that construction of new stations is slowing down, and the expected result shows up on the chart above—lower sales of television sets in 1955.

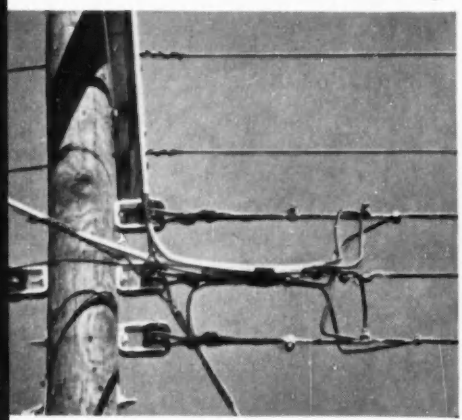
In the long run, this will be a good thing for utilities. Until recently, few people thought that cheap color television—say, for less than $500—would be available for at least another couple of years. But, if black and white sales slip badly, producers are sure to speed up the schedule as much as they can. The result could be color for less than $500 before the end of 1955.

The arrival of relatively cheap color TV will make a substantial contribution to residential power consumption within a fairly short period. Naturally, everyone won't junk his old set as soon as color reaches $500. But the chances are that, within a couple of years after that happy day, the vast majority of new sets sold will be color.

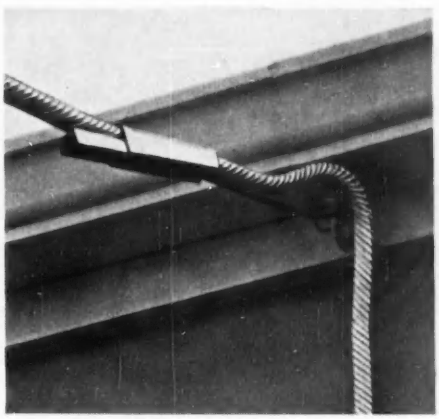
The much higher power consumption of color sets means that previous estimates of future TV power consumption will have to be junked if cheap sets arrive soon. If this happens, television sets may account for as much as 10% of the electric power consumption of the average home by 1960.



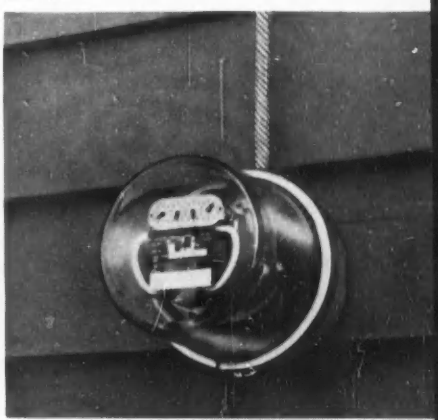
ANACONDA'S TYPE K service drop cable. Tough aluminum ribbon covering over neoprene-insulated conductors reduces outages caused by foreign objects.



POLE END OF CABLE is deadended with aid of grip attached to secondary neutral bracket by service clevis.



HOUSE END IS ATTACHED by cable clamp and service hook. Type K cable bends without loosening ribbons to provide drip.



DIRECT TO METER. Type K may be installed from pole to outdoor meter without splice or tap where local ordinances permit.

TYPE K SERVICE DROP ASSURES LONG TROUBLE-FREE OPERATION

To help cut trouble calls and costs, Anaconda offers Type K aluminum service drop cable for pole to meter run.

This cable gives long, economical service and reduces outages caused by foreign objects during wet weather.

Conductors of Type K are protected by tough, spirally wrapped flat bare aluminum neutral. This covering helps prevent tree limbs and other foreign objects from chafing through the insulation to the conductors and shorting the line.

Type K cable is light, flexible, easy to install. It is neat. And insulation of specially compounded neoprene gives excellent electrical properties.

Ask your Anaconda Salesman or Distributor for full information today. Or write Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

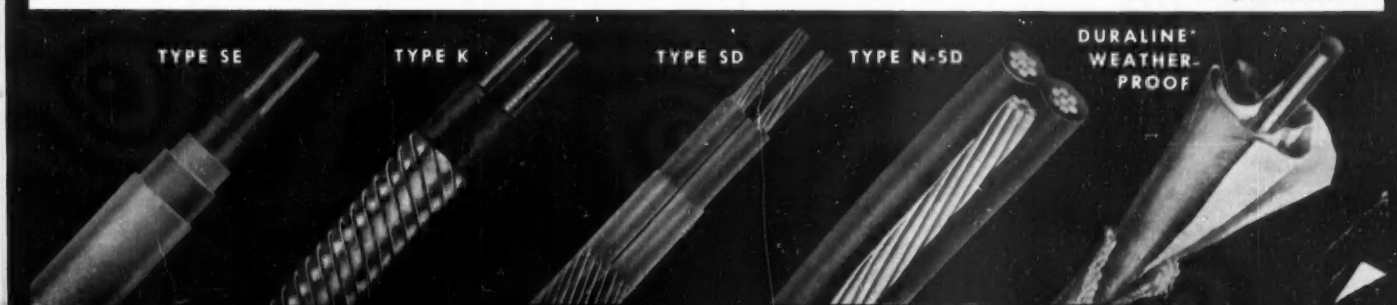
64397

TYPE K service drop cable

ANACONDA®

Single source for every type service drop and entrance cable — in aluminum and copper

*Reg. U. S. Pat. Off.



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NOW a complete line of smaller, lighter, single-phase distribution transformers

NOW THE IMPORTANT ADVANTAGES of *Curvacore* design come to you on larger Allis-Chalmers distribution transformers as well as on the smaller units. You get the benefits of low exciting current, low losses, good regulation, and reduced dimensions and weight on transformers up to 500 kva, 15 kv and below. A-4488

New Weight Savings Simplify Installation

As much as 20% savings in weight have been effected by the application of *Curvacore* design to the larger sizes. Handling is easier, installation takes less time. More capacity can be installed on a pole.

In addition to the highly efficient electrical assembly that *Curvacore* design makes possible, you get a sealed transformer with retained Corprene gaskets used at all joints. Paint is especially formulated to resist industrial atmosphere, salt spray and climatic conditions.

ALLIS-CHALMERS
DISTRIBUTION TRANSFORMERS

Curvacore design permits full utilization of the advantages of cold-rolled oriented steel to permit flux path to follow grain. Photo at left shows how core steel resumes its original shape as it is being laced into windings of an Allis-Chalmers distribution transformer. Result is high permeability, low losses, and a mechanically stronger core structure of less weight than previous designs.

Field Stocks Available
You can get immediate shipment on most sizes from conveniently located stocking points. Call your nearby A-C office for information or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Curvacore is an Allis-Chalmers trademark.

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